# Exhibit 12

#23



P18446.A11

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellants : M. KLEIN et al.

Appln. No. : 09/390,996

Group Art Unit: 2673

Examiner: J. Nguyen

Filed : September 7, 1999

For : METHOD AND DEVICE FOR DETECTING SPECIFIC STATES OF MOVEMENT OF A USER



**APPEAL BRIEF**

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

This appeal is from the Examiner's final rejection of March 20, 2001. Appellants filed a Notice of Appeal on July 20, 2001 and are filing this Appeal Brief along with a one month extension of time to extend the due date from September 20, 2001 to October 20, 2001. A request for an extension of time for one month is being filed concurrently with this brief.

## A. REAL PARTY IN INTEREST

The real party in interest for the invention is Maximilian KLEIN and Peter LUTZ of Munich, Germany.

## B. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences which would directly affect or be directly

affected by or have a bearing on the Board's decision in the pending appeal.

## C. STATUS OF CLAIMS

Claims 1-77 are pending with claims 15-20 being withdrawn by the Examiner as directed to a non-elected species.

Claims 1, 8, 12 and 25-27 stand finally rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 5,860,861 to LIPPS et al. (hereinafter LIPPS).

Claims 9, 13, 14 and 22 stand finally rejected under 35 U.S.C. 103(a) as being unpatentable over LIPPS in view of U.S. Patent No. 5,613,690 to McSHANE et al. (hereinafter McSHANE).

Claims 21 and 23 stand finally rejected under 35 U.S.C. 103(a) as being unpatentable over LIPPS in view of U.S. Patent No. 5,049,079 to FURTADO et al. (hereinafter FURTADO).

Claim 24 stands finally rejected under 35 U.S.C. 103(a) as being unpatentable over LIPPS in view of U.S. Patent No. 5,283,555 to WARD et al. (hereinafter WARD).

Claims 2-7, 10 and 11 stand objected to as being dependent on a rejected base claim, but would be allowable if presented in independent form.

Claims 28-77 are allowed.

**D. STATUS OF AMENDMENTS**

The response to the Final Official Action filed on May 21, 2001 has been entered, as indicated in the May 31, 2001 Advisory Action. No amendment, other that the aforementioned response, has been filed following the final rejection.

**E. SUMMARY OF INVENTION**

The invention is directed to a method and a device for detecting the specific states of movement of a user. This is accomplished by mounting a support surface onto a base part. The support surface can rotate about a substantially vertical axis and/or move in the direction of a substantially vertical axis. A sensor device is mounted within a joint that is arranged between the base part and the support surface and is used to detect a direction and a magnitude of a rotational movement of the body of the user about the substantially vertical axis, and/or to detect at least the magnitude of a vertical movement of the body's center of gravity. As a result of this detecting, the sensor device generates corresponding sensor signals. (Specification page 4, lines 6-12).

The invention, has been given the name "CYBERSURFER" by Appellants because it allows for the detection of shifts of the body weight of the user (which are used to control locomotion in virtual space) as well as rotational and vertical movements of the user, movements similar to those experienced by a surfer. However, the invention may be used in connection with computer games in which it is possible to simulate branches of sports

other than surfing, such as snowboarding, skate-boarding, or sports wherein the virtual body of the user has to jump over virtual obstacles such as streams, gorges, etc. or climb rock faces, etc. (Specification page 4, lines 12-18).

In operation, a user generally stands on the support surface of the CYBERSURFER. The user then puts on a cyber-helmet which is used to take in an entire virtual field of vision, i.e., the user is blind to his real environment. (Specification page 4, lines 19-24).

The support surface is preferably embodied as the upper surface of a standing plate which is mounted to a joint which is supported by the base part. However, the invention also contemplates an embodiment wherein the support surface is formed by the upper surface of two smaller rest surfaces, i.e., one for each foot of a user, which are mounted via a common connecting tube to the joint. (Specification page 5, lines 1-5).

According to one embodiment of the invention, the support surface is rotatably mounted to an intermediate part that is arranged between the joint and the support surface. Each of the support surface and the intermediate part are mounted to the base part via the joint so as to be tiltable. This design allows the support surface to both rotate and tilt with respect to the base part, while the intermediate part is able to tilt only, i.e., the intermediate part is non-rotatably mounted to the base part, but is allowed to tilt with respect thereto. (Specification page 5, lines 6-10).

The support surface may be mounted to the base part via a ball-and-socket type joint such that the support surface can both tilt and rotate about a substantially vertical axis. The

joint which couples the support surface to the base part includes a tubular section which is telescopically guided within another tubular section that is secured to the base part. The design of the joint can be such that four degrees of freedom of movement can be detected by the device according to the invention. This can be achieved with a simple and mechanically rugged construction. (Specification page 5, lines 11-16).

A sensor device is mounted within the joint, i.e., within the telescoping tubular sections, so as to be protected against damage. A first part of the sensor device is secured to the base part and a second part of the sensor device is connected to a part of the ball-and-socket joint which is fixed to the support surface, so as to tilt and rotate with the support surface. The invention contemplates the use of any suitable type of sensor devices such as those of the potentiometer type, the strain gauge type, etc. However, because of its low susceptibility to wear, it is preferred that at least one of the sensor devices be of an optoelectronic type, such as of the type used in the SPACE MOUSE (trademark). (Specification page 5, line 17 to page 6, line 11).

In order to make it easier for the user to keep his balance on the CYBERSURFER and also to limit the maximum angle of tilt of the support plate to a relatively small value of, for example, 10° to 15°, a restoring device is provided beneath the support surface for opposing a tilting of the support surface. This restoring may have the form of a hose-like compressible element which is filled with a compressible medium. In one embodiment, the compressible element is mounted between the intermediate part and the base part in order to oppose the

tilting of both the support surface and the intermediate part. (Specification page 6, lines 12-23).

The invention may also include a rotation restoring device which acts to counteract the rotation of the support surface caused by the user, e.g., when the support surface undergoes a rotational deflection due to the upper part of the user's body rotating relative to his legs. The rotational restoring device ensures that the support surface, and thus the body of the user, is returned to an initial rotational position. A friction or damping device may additionally be associated with the rotational mounting arrangement to prevent this return movement from occurring too quickly. The restoring device may be embodied as an elastic, elastomeric or spring-elastic element which has one end connected to the support surface and another end connected to the intermediate part. (Specification page 6, line 19 to page 7, line 5).

The invention also contemplates using a vertical restoring device to oppose vertical movements of the support surface, especially when the direction of the vertical movements of the user is to be detected. This vertical restoring device may include, e.g., at least one compressible element which is filled with a compressible medium. Such a device may be in the form of a compressed-air hose and may have the dual function of being a tilt restoring device, just like the one discusses above, and being a vertical restoring position. (Specification page 7, lines 13-20).

In order to make the device safer for the user and with regard to protecting the

CYBERSURFER itself, as well as the sensor device, the invention provides for various limiting devices such as, e.g., a tilt limiting device, and/or a rotational angle limiting device, and/or a vertical movement limiting device. Each of these limiting devices may function to limit movement by using the mechanical engagement of one stop surface with another stop surface. (Specification page 9, lines 4-9).

The invention also contemplates designing the initial position of the support surface so as to be variable or adjustable with respect to its distance from the base part. (Specification page 9, lines 4-9).

According to one embodiment of the invention, the support surface may have a non-slip surface coating, and/or may also include one or more retaining loops which are used to secure the foot of the user to the support surface. (Specification page 9, lines 15-18).

The invention also utilizes one or more connections which allow the CUBERSURFER to be connected to additional devices for detecting movements of the user. These can include a cyber-glove, and/or a visual and/or acoustic output unit. A number of possible visual output units may also be utilized other than an already mentioned cyber-helmet. These include various monitors and projection devices, such as e.g., large-area laser projectors. Utilizing various combinations of these devices can help to augment the impression of virtual reality. (Specification page 9, lines 19-25).

The CYBERSURFER may also include a standardized interface for communication with a data processing system. This interface may be a standardized serial or parallel

interface, and/or may be a standardized game port interface. (Specification page 10, lines 1-5).

The method contemplated by the invention provides for controlling the movement of a body virtually present in a data processing system in a correspondingly virtual space on the basis of the states of movement of the real body of a user which are detected by a device according to the invention. The method provides that different movement parameters of the virtual body are controlled on the basis of detected sensor signals. (Specification page 10, lines 6-11).

These sensor signals or the underlying movements/states of movement of the real body of the user in real space may be used in different ways to control the movement of the body in virtual space. (Specification page 10, lines 12-14).

For example, the direction of a translatory movement of the virtual body may be controlled on the basis of a detected direction in the shift of the center of gravity of the real body of the user. In this regard, the speed of a translatory movement of the virtual body is controlled on the basis of the magnitude of the shift of the center of gravity of the real body of the user. In this way, the shift of body weight is used solely to control the translatory movement of the body in virtual space. (Specification page 10, lines 15-20).

The method provides for various interpretation possibilities for the movement of the support surface which results from a shift in the body weight of the user. These may include the control of the direction and magnitude of a rotation of the virtual body about its vertical

axis on the basis of the detected direction or the detected magnitude of a rotational movement of the real body of the user, and/or the control of the direction and magnitude of a movement of the virtual body in the direction of its vertical axis on the basis of the detected direction or the detected magnitude of the impulse transmission as a result of a vertical movement of the real body of the user. (Specification page 12, lines 3-10).

The device 10 for detecting certain states of movement of the body of a user is shown in Fig. 1. The device 10 includes a base cradle 12 having a base plate 12a and a circumferential edge adjoining the base plate 12a. The device 10 is mounted on a foundation 16, which can be the floor of a room, and may utilize a swing-out foot 14. A standing plate 18 is mounted in the base cradle 12. (Specification page 13, lines 7-12).

As shown in Fig. 3, a pivot pin 22 is secured to the standing plate 18, by way of e.g., a screw bolt 20. This screw bolt 20 connects the standing plate to one end of the pin 24, with another end of the pin being connected to a joint ball 24. The joint ball 24 is held in a bearing shell which is formed by two bearing shell halves 26. The two bearing shell halves 26 are firmly connected together and to a tubular section 28, which is telescopically guided in another tubular section 30 that is secured to a base plate 12. (Specification page 13, lines 13-17).

The mounting arrangement allows the standing plate 18 to be tilted relative to the base plate 12 about two (disregarding the angle of inclination $\alpha$ due to the swing-out foot 14) directions in space, i.e., X and Y directions which extend substantially horizontally and

orthogonally with respect to one another. The standing plate 18 is also allowed to rotate about an axis Z which extends substantially vertically and orthogonally to the X and Y directions, and is allowed to move in translatory fashion in the direction of the Z axis, i.e., vertically up and down. (Specification page 13, lines 18-23).

As seen in Fig. 3, the above-mentioned movements of the standing plate 18 are detected by an optoelectronic sensor unit 32 which utilizes a light source 34 that is connected to the joint ball 24. A plurality of photodetectors 36 are disposed in the area of the circumference of the tubular section 30. In order to allow light to pass from the light source 34 to the photodetectors 36, openings 28a are provided in the tubular section 28 at locations which correspond to the locations of the photosensors 36. These openings 28a allow the light to reach the photodetectors during the telescopic movement of the inner tubular section 28 within the outer tubular section 30. It should be noted that the inner tubular section 28 does not rotate with respect to outer tubular section 30, i.e., neither of the tubular sections 28 and 30 rotate about the vertical axis Z. The light source 34 is of the type which emits a plurality of light beams of a predetermined characteristic which are detected by the photodetectors 36. (Specification page 13, line 24 to page 14, line 7).

The sensor signals detected by the photosensors 36 correspond to the state of movement of the standing plate 18 relative to the base cradle 12. These signals are transmitted via a signal line 38 to a data processing system. The optoelectronic sensor device 32 may be of the e.g., SPACE MOUSE (trademark) type. (Specification page 14, lines 13-

17).

The CYBERSURFER 10 also includes various restoring devices which oppose a deflection or movement of the standing plate 18 relative to an initial position. As shown in Fig. 1, a tilt restoring device may be utilized having the form of a hose 40 which is filled with compressed air. This hose 40 functions to oppose both a tilting movement of the standing plate 18 about the ball-and-socket joint 24/26, as well as an inward (i.e., downward) movement of the standing plate 18 along the vertical direction Z. The hose 40 is arranged within and supported by the base cradle 12 and acts to support an intermediate plate 42 and the standing plate 18. The intermediate plate 42 is coupled to the pivot pin 22 via a rotational bearing 44 (see Fig. 3). This allows the pivot pin 22 to rotate with respect to the intermediate plate 42 which is non-rotatably mounted to the hose 40 and the base cradle 12. The standing plate 18 is rotatably supported on the intermediate plate 42 via a plurality of ball bearings 46 (see also Fig. 2). This design allows the standing plate 18 to both tilt and rotate about the axis of the pivot pin 22. The ball bearings 46 include bearing balls 46a, which are retained on an upper side of the intermediate plate 42 in bushings 46b. The balls 46a are guided on the underside of the standing plate 18 in tracks 46c which may extend over a rotation angle of approximately 10° to 15°, related to the axis A of the pivot pin 22. (Specification page 14, line 18 to page 15, line 6).

As shown in Fig. 2, a restoring device is provided for opposing a rotating movement of the standing plate 18 about the axis A of the pivot pin 22. The restoring device utilizes

elastic elements 48, (e.g., rubber bands or helical tension springs) which have one end 50 connected to the standing plate 18 and another end connected to a slide 52. The slide 52 is arranged to be movable in a radial direction R on a screw spindle 54 which is connected to the intermediate plate 42 (See Fig. 1). The screw spindle 54 can be rotated through an opening 12c provided in a side wall 12b of the base cradle 12 by way of a tool (not shown). The spindle 54 functions to adjust or vary a preloading of the elastic elements 48, and accordingly adjusts or varies the restoring force on the standing plate 18. (Specification page 15, lines 7-14).

Various movement limiting devices are provided in the form of detent devices for limiting each of the degrees of freedom of movement of the standing plate 18. (Specification page 15, lines 15-18).

With reference to Fig. 3, a detent device is used to oppose tilting of the support plate 18. This detent device includes a detent pin 56 which is connected to the joint ball 24. The detent pin 56 is arranged to engage a detent recess 58a that is formed in a mating element 58. The mating element 58 is shaped so as to cause the detent pin 56 to be engaged within the detent recess 58a when the standing plate 18 is not tilted and is movably disposed within the inner tubular section 28. The mating element is also biased upwards, i.e., towards the detent pin 56 by a spring 60 which is supported on the base plate 12a. By way of this configuration, the detent pin 56 is caused to automatically return to the detent depression 58a, e.g., such as when there is no load on the support surface 74 or when the load on the support surface 74

is balanced with respect to the axis A. (Specification page 15, line 19 to page 16, line 3).

Again with reference to Fig. 3, a detent device is utilized to oppose a rotational movement of the standing plate 18 about the axis A of the pivot pin 22. This detent device includes a detent groove 62 formed in the joint ball 24 and a detent body 64 arranged in one of the bearing shell halves 26. The detent body 64 is preloaded by a spring and biased towards the detent groove 62. (Specification page 16, lines 4-10).

Also shown in Fig. 3 is another detent device which is utilized to oppose a vertical movement of the standing plate 18. This detent device utilizes a detent lug 66 which is arranged on the inner tubular section 28 and which engages in a detent notch 68 that is formed in the outer tubular section 30. (Specification page 16, lines 11-15).

With reference to Fig. 1, the standing surface 74 of the standing plate 18 is provided with a non-slip surface coating and/or a non-slip surface structure. Loops 76 are also used for securing the user's feet to the standing plate 18. These are utilized to allow the user to move the standing plate 18. (Specification page 17, lines 1-3).

Various connections are provided for connecting the device 10 to peripheral devices. Fig. 1 shows a connection 78 which is used for connecting an input unit which may be, e.g., a joystick, a cyber-glove or other similar device. Another connection 80 may be utilized for connecting a unit of the visual and/or acoustic indication of data type, such as, e.g., a cyber-helmet. The visual/acoustic indication may also take place via a conventional visual display unit which is directly connected to the data processing system. (Specification page 17, lines

4-8).

Fig. 4 shows an alternative embodiment of the joint and sensor subassembly which may be used on the CYBERSURFER. The subassembly of Fig. 4 corresponds in many respects to that of Fig. 3, but differs in some respects. (Specification page 17, line 22 to page 18, line 3).

In the Fig. 4 embodiment, the pivot pin 122 has a hole 122a in which two ball bearing shell halves 126 are held and retained by way of retaining rings 126a. Two fixing flanges or projections 128b are disposed on a cover section 128g of the inner tubular section 128. A screw bolt 128c is secured to the projections 128b by way of a nut 128d. The bolt 128c also passes through a hole in the joint ball 124. The joint ball 124 is fixed on the bolt 128c by being trapped between a collar 128c1 and a clamping sleeve 128e. (Specification page 18, lines 4-13).

As with the embodiment of Fig. 3, the inner tubular section 128 is mounted within the outer tubular section 130 so as to be telescopically movable in the vertical direction Z. The outer tubular section 130 is also similarly secured to the base plate 112a. However, in contrast to the Fig. 3 embodiment, a radially inner annular projection 130a is provided on the outer tubular section 130 to support the inner tubular section 128 in an initial position. The base plate 112a, the tubular sections 130 and 128, as well as the cover 128g together form a holding space 182 which houses the sensor unit 132, with the sensor unit 132 being accessible through an opening 112a1 formed in the base plate 112a. (Specification page 18,

lines 14-21).

The sensor unit 132 shown in Fig. 4 is similar to the SPACE MOUSE (trademark), which has already been mentioned. The unit 132 utilizes a stationary plate 132a which is secured via a support arrangement 184 to the annular projection 130a of the outer tubular section 130. A plate 132b is movably mounted relative to the plate 132a. A plurality of light sources 134 and a plurality of photodetectors 136 are each mounted on the stationary plate 132a and a plurality of screen elements 137 are disposed on the mobile plate 132b between the light sources 134 and the photodetectors 136. The mobile plate 132b is guided relative to the stationary plate 132a by way of vertically oriented guide elements 132c. Stop shoulders 132c1 are provided on the guide elements 132c to ensure that a minimum distance is maintained between the two plates 132a and 132b. The mobile plate 132b and the stationary plate 132a are also connected together by springs 132d which bias the two plates 132a and 132b into a predetermined initial position relative to one another. (Specification page 18, line 22 to page 19, line 8).

A tubular section 132e is held within a pot-shaped protective housing 186 and is secured to an outer circumference of the mobile plate 132b. The protective housing 186 is connected to the pivot pin 122 and transmits the tilting and rotational movements of the pivot pin 122 to the tubular section 132e and mobile plate 132b. The protective housing 186 also transmits downward movements of the pivot pin 122 to the tubular section 132e and the mobile plate 132b of the sensor unit, with the downward movement being ultimately limited

by the annular projection 130a. (Specification page 19, lines 9-15).

As with the embodiment shown in Fig 3, the sensor device of Fig. 4 functions with sensor signals which are detected by the photodetectors 136 that correspond to the state of movement of the standing plate 18 relative to the base cradle 112. These signals are transmitted via a signal line 38 to a data processing system.

**F. ISSUES ON APPEAL**

i. Whether the Invention Recited in Claims 1, 8, 12 and 25-27 Is Anticipated by LIPPS.

ii. Whether the Invention Recited in Claims 9, 13, 14 and 22 Would Have Been Obvious Over LIPPS in View of McSHANE.

iii. Whether the Invention Recited in Claims 21 and 23 Would Have Been Obvious Over LIPPS in View of FURTADO.

iv. Whether the Invention Recited in Claim 24 Would Have Been Obvious Over LIPPS in View of WARD.

## G. GROUPING OF CLAIMS

The following groups of claims are considered to stand or fall together, but only for the purpose of this appeal: claims 1, 8, 12, 14, 22 and 25-27 stand or fall together. The remaining claims do not stand or fall together, at least for reasons explained below.

## H. ARGUMENT

### i. Claims 1, 8, 12 and 25-27 Patentably Define Appellants' Invention; the Rejection Should be Reversed.

Reversal of the rejection of claims 1, 8, 12 and 25-27 under 35 U.S.C. 102(e) as anticipated by LIPPS is requested.

In the rejection, the Examiner cites Fig. 3, col. 5, lines 56-60 and col. 6, lines 12-16 in support of the rejection and asserts, among other things, that LIPPS discloses all the features of independent claim 1 including a bearing device which includes a platform 26 which is mounted in a tiltable manner (see Figs. 5-6), on a base 22 having an upper surface, a sensor device made up of switches 40, 42, 44, 46 and 48, and that the upper surface "can move in a direction parallel to the axis of vertically oriented when the upper surface is oriented horizontally."

The Examiner additionally asserts that LIPPS discloses the features of dependent claims 8, 12 and 25-27. In particular, the Examiner asserts that the spring 56 shown in Fig. 3 constitutes the claimed tilt and vertical restoring devices of claims 8 and 12, and that Fig.

1 shows the claimed connections, as well as associated devices which are connected to the connections. Appellants respectfully traverse the Examiner's assertions.

Applicants' independent claim 1 recites, inter alia, that a support unit comprises a standing part having a support surface and is mounted in a tiltable manner on a base part, wherein the support surface can *either rotate about an axis or move in a direction which is parallel to said axis*, said axis being one of:

vertically oriented when the support surface is oriented horizontally;

perpendicular to at least the support surface; or

running through at least the base part and the support surface when the support surface is not tilted; or

running through at least the support surface and a tiltable mounting; or

running through at least the base part and a tiltable mounting.

Appellants note that LIPPS fails to disclose any tiltable support unit which can either rotate or move parallel to an axis as defined in the claim 1, much less, a tiltable support unit which includes a standing part having a support surface that can *either rotate about the axis or move in a direction which is parallel to the axis.*

Appellants note that independent claim 1 defines the axis in a number of alternative ways. According to one definition of the axis, the axis is said to be vertically oriented when the support surface is oriented horizontally. Under this definition, the axis would correspond to, e.g., axis C in Figs. 4-6, since axis C is perpendicular to the horizontally oriented platform

26. In this regard, it is clear from the Figs. 5 and 6, that the platform 26 can tilt with respect to axis C. However, it is equally clear from Figs. 3-6, that the platform 26 does not also *either rotate about the axis C or move in a direction which is parallel to the axis C.* To the contrary, the fact that the platform 26 is not centrally mounted and is instead mounted longitudinally at two end points, i.e., 31 and 32, clearly means that the platform is not designed to rotate. It is also true that the platform 26 cannot move parallel to the axis C. It is discernable from Fig. 3 that end 50 of the platform 26 is movable downwards, i.e., against the biasing force of the spring 62. However, the same cannot be said of end 52 because rubber bushings 72 prevent the downward movement of this end. Accordingly, it is obvious that the downward movement of only one end, i.e., end 50, would only constitute a tilting movement, rather than a movement that is parallel to the axis C. In other words, the tilting movement shown in LIPPS is a non-parallel movement of only one end of the platform 26. On the other hand, claim 1 requires a movement of the entire platform 26 downward or upward, a movement which would be parallel to axis C.

According to another definition of the axis, the axis is said to be perpendicular to at least the support surface. Under this definition, the axis would similarly correspond to, e.g., axis C in Figs. 4-6, since axis C is perpendicular to the horizontally oriented platform 26. Again, it is clear from the Figs. 5 and 6, that the platform 26 can tilt with respect to axis C. However, it is equally clear from Figs. 3-6, that the platform 26 does not also *either rotate about the axis C or move in a direction which is parallel to the axis C.* To the contrary, the

fact that the platform 26 is not centrally mounted and is instead mounted longitudinally at two end points, i.e., 31 and 32, clearly means that the platform is not designed to rotate. It is also true that the platform 26 cannot move parallel to the axis C. It is discernable from Fig. 3 that end 50 of the platform 26 is movable downwards, i.e., against the biasing force of the spring 62. However, the same cannot be said of end 52 because rubber bushings 72 prevent the downward movement of this end. Accordingly, it is apparent that the downward movement of only one end, i.e., end 50, would only constitute a tilting movement, rather than a movement that is parallel to the axis C. In other words, the tilting movement shown in LIPPS is a non-parallel movement of only one end of the platform 26. On the other hand, claim 1 requires a movement of the entire platform 26 downward or upward, a movement which would be parallel to axis C.

According to still another definition of the axis, the axis is said to be running through at least the base part and the support surface when the support surface is not tilted. Under this definition, the axis would also correspond to, e.g., axis C in Figs. 4-6, since axis C runs through the base part 22/24 and the platform 26 when the platform is not tilted. As noted above, it is clear from Figs. 5 and 6, that the platform 26 can tilt with respect to axis C. However, it is equally clear from Figs. 3-6, that the platform 26 does not also *either rotate about the axis C or move in a direction which is parallel to the axis C.* To the contrary, the fact that the platform 26 is not centrally mounted and is instead mounted longitudinally at two end points, i.e., 31 and 32, clearly means that the platform is not designed to rotate. It

is also true that the platform 26 cannot move parallel to the axis C. It is discernable from Fig. 3 that end 50 of the platform 26 is movable downward, i.e., against the biasing force of the spring 62. However, the same cannot be said of end 52 because rubber bushings 72 prevent the downward movement of this end. Accordingly, it is apparent that the downward movement of only one end, i.e., end 50, would only constitute a tilting movement, rather than a movement that is parallel to the axis C. In other words, the tilting movement shown in LIPPS is a non-parallel movement of only one end of the platform 26. On the other hand, claim 1 requires a movement of the entire platform 26 downward or upward, a movement which would be parallel to axis C.

According to yet another definition of the axis, the axis is said to be running through at least the support surface and a tiltable mounting. Under this definition, the axis would still correspond to, e.g., axis C in Figs. 4-6, since axis C runs through the platform 26 and tiltable mounting 31/32. Again, it is notable from Figs. 5 and 6, that the platform 26 can tilt with respect to axis C. However, it is equally clear from Figs. 3-6, that the platform 26 does not also *either rotate about the axis C or move in a direction which is parallel to the axis C.* To the contrary, the fact that the platform 26 is not centrally mounted and is instead mounted longitudinally at two end points, i.e., 31 and 32, clearly means that the platform is not designed to rotate. It is also true that the platform 26 cannot move parallel to the axis C. It is discernable from Fig. 3 that end 50 of the platform 26 is movable downward, i.e., against the biasing force of the spring 62. However, the same cannot be said of end 52 because

rubber bushings 72 prevent the downward movement of this end. Accordingly, it is obvious that the downward movement of only one end, i.e., end 50, would only constitute a tilting movement, rather than a movement that is parallel to the axis C. In other words, the tilting movement shown in LIPPS is a non-parallel movement of only one end of the platform 26. On the other hand, claim 1 requires a movement of the entire platform 26 downward or upward, a movement which would be parallel to axis C.

According to a final definition of the axis, the axis is said to be running through at least the base part and a tiltable mounting. Under this definition, the axis would still correspond to, e.g., axis C in Figs. 4-6, since axis C runs through the base part 22/24 and the tiltable mounting 31/32. Again, it is notable from Figs. 5 and 6, that the platform 26 can tilt with respect to axis C. However, it is equally clear from Figs. 3-6, that the platform 26 does not also *either rotate about the axis C or move in a direction which is parallel to the axis C.* To the contrary, the fact that the platform 26 is not centrally mounted and is instead mounted longitudinally at two end points, i.e., 31 and 32, clearly means that the platform is not designed to rotate. It is also true that the platform 26 cannot move parallel to the axis C. It is discernable from Fig. 3 that end 50 of the platform 26 is movable downward, i.e., against the biasing force of the spring 62. However, the same cannot be said of end 52 because rubber bushings 72 prevent the downward movement of this end. Accordingly, it is obvious that the downward movement of only one end, i.e., end 50, would only constitute a tilting movement, rather than a movement that is parallel to the axis C. In other words, the tilting

movement shown in LIPPS is a non-parallel movement of only one end of the platform 26. On the other hand, claim 1 requires a movement of entire platform 26 downward or upward, a movement which would be parallel to axis C.

Appellants do not dispute that the support platform 26 is mounted in a tiltable manner to the base part 22/24, i.e., the platform 26 is a standing part having a support surface and can tilt to the left (as shown in Figs. 5 and 6) and to the right (not shown). However, it is not the case that this same support platform 26 can rotate with respect to axis, e.g., axis C, and the Examiner has failed to identify any such axis. It is also equally clear that the platform 26 cannot move up and down with respect to any certain axis, and, again, the Examiner has failed to identify any such axis.

Appellants stress that the platform 26 is merely pivotally or tiltably mounted to the mounting plate 24 via front and rear pivot supports 31 and 32 (hence the name "pivot supports"). Moreover, it is clear from these figures, that front pivot support 31 is structurally different from rear pivot support 32, and that these differences are such that they allow front and rear ends 50 and 52 of the platform 26 to pivot about a single pivot support, i.e., the rear pivot support 32. Appellants fully appreciate that the platform 26 can pivot to either side about both pivot supports 31 and 32 (i.e., tilt), as is shown in Fig. 6. However, even such sideways pivoting movement cannot be said to also constitute rotation of the platform 26 with respect to a defined axis, and Appellants submit that the Examiner has failed to identify any such axis. Moreover, such sideways movement cannot also be said to constitute up and

down movement of the platform 26 with respect to a defined axis and, again, the Examiner has failed to identify any such axis.

It should be clear from Figs. 3-6, that spring 62 of front pivot support 31 allows only the front portion 50 of platform 26 to move up and down, and that such movement merely constitutes a pivoting movement with respect to pivot support 32. On the other hand, Fig. 3 illustrates that the rear pivot support 32 prevents the rear portion 52 of the support platform 26 from also moving up and down in the same manner. Appellants direct the reader's attention to Fig. 3 and col. 6, lines 47-54, wherein it is clearly indicated that the pivot support 32 utilizes bushings 72, while pivot support 31 uses a spring 62. It follows from such a design that any downward force exerted on the platform 26 would be opposed by the bushings 72, but not by the spring 62, i.e., the spring 62 would allow the platform 26 to move downward while the bushings would oppose such movement. The result of this design is clear, i.e., the front portion 50 of the platform 26 is allowed to pivot clockwise about pivot support 32 and prevents the platform from, e.g., moving downward while remaining parallel to the mounting plate 24m or rotating about an axis running through support 32 when the platform 26 is horizontally oriented.

Appellants submit that the design of the pivot supports 31 and 32 is such that the platform 26 cannot both tilt and *either rotate about an axis or move in a direction which is parallel to said axis*, said axis being one of: vertically oriented when the support surface is oriented horizontally, perpendicular to at least the support surface, running through at least

the base part and the support surface when the support surface is not tilted, running through at least the support surface and a tiltable mounting, or running through at least the base part and a tiltable mounting.

Because LIPPS fails to disclose at least the above-noted features of at least amended independent claim 1, Appellants submit that LIPPS fails to disclose each and every recited feature of the instant invention. Thus, Appellants submit that the Examiner has failed to establish an adequate evidentiary basis to support a rejection of anticipation under 35 U.S.C. § 102(e), and that the instant rejection is improper and should be withdrawn.

Claims 8, 12 and 25-27 stand or fall with independent claim 1 for purposes of this appeal.

Thus, for reasons given above, reversal of the rejection of claims 1, 8, 12 and 25-27 is requested.

**ii. Claims 9, 13, 14 and 22 Patentably Define Appellants' Invention; the Rejection Should be Reversed.**

Reversal of the rejection of claims 9, 13, 14 and 22 under 35 U.S.C. 103(a) over LIPPS in view of McSHANE is requested.

Claims 9, 13, 14 and 22 depend from independent claim 1. Therefore, the rejection of these claims should be reversed at least for the reasons given above with regard to the traversal of the rejection of claim 1.

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In the rejection, the Examiner acknowledges that LIPPS fails to disclose a tilt restoring device and a vertical restoring device which each comprise compressible elements, a variable vertical restoring device, and a support surface having a non-slip surface. However, the Examiner asserted that McSHANE teaches these features and that it would have been obvious to provide these feature on the device of LIPPS in order to allow the user to stand stably and to adjust a desired resistance. Appellants respectfully traverse the Examiner's assertions and conclusions.

The Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art. This burden is perhaps most succinctly stated in M.P.E.P. 706.02(j) (pages 700-16 - 700-17, July 1998), viz., after indicating that the rejection is under 35 U.S.C. §103, there should be set forth (1) the relevant teachings of the prior art relied upon; (2) the difference or differences in the claim over the applied reference(s); (3) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter; and (4) an explanation why such proposed modification would have been obvious. It is further explained that, to establish a prima facie case of obviousness, three additional criteria are necessary: (1) there must be some suggestion or motivation to modify the reference; (2) there must be a reasonable expectation of success; and (3) the prior art reference must teach or suggest all the claim limitations. Further, in citing *In re Vaeck*, 20 USPQ2d 1438 (Fed. Cir. 1991) and *Ex parte Clapp*, 227 USPQ 972 (Bd. Pat. App. & Inter. 1985), it is stated in the M.P.E.P. that the teaching or suggestion to make the claimed invention must be found in the

prior art and not be based upon the Appellants' disclosure.

Appellants submit that the rejection of claims 9, 13, 14 and 22 should be reversed at least for the following three reasons.

Appellants submit that the subject matter of dependent claims 9, 13, 14 and 22 is not disclosed or suggested by any proper combination of LIPPS and McSHANE. Specifically, Appellants submit that no proper combination of LIPPS and McSHANE discloses or suggests the invention as defined by at least independent claim 1.

Notwithstanding the Examiner's assertion as to what these documents disclose, Appellants submit that each of LIPPS and McSHANE fails to disclose, inter alia, that a support unit comprises a standing part having a support surface and is mounted in a tiltable manner on a base part, wherein the support surface can *either rotate about an axis or move in a direction which is parallel to said axis*, said axis being one of:

vertically oriented when the support surface is oriented horizontally;

perpendicular to at least the support surface; or

running through at least the base part and the support surface when the support surface is not tilted; or

running through at least the support surface and a tiltable mounting; or

running through at least the base part and a tiltable mounting.

Appellants note that each of LIPPS and McSHANE fails to disclose any tiltable surface which can either rotate or move parallel to an axis as defined in Applicants' claim 1,

much less, a tiltable support surface which can *either rotate about the axis or move in a direction which is parallel to the axis.*

As discussed above, it is clear from Figures 3-6 of LIPPS that the support platform 26 cannot both tilt and rotate with respect to any defined axis, and the Examiner has failed to identify any such axis. It is also equally clear that the platform 26 cannot both tilt and move up and down with respect to any defined axis, and, again, the Examiner has failed to identify any such axis.

In contrast to the invention, the platform 26 in LIPPS is merely pivotally mounted to the mounting plate 24 via front and rear pivot supports 31 and 32 (hence the name "pivot supports"). Moreover, it is clear from these figures, that front pivot support 31 is structurally different from rear pivot support 32, and that these differences are such that they allow front and rear ends 50 and 52 of the platform 26 to pivot about a single pivot support, i.e., the rear pivot support 32.

Additionally, it is clear from Figures 1 and 2 in McSHANE that the support platform 12 can tilt. However, such a platform 12 cannot also be said to rotate with respect to any defined axis, i.e., springs 36 would prevent such rotation, and the Examiner has failed to identify any such axis. It is also equally clear that the platform 12 cannot also move up and down with respect to any defined axis, and, again, the Examiner has failed to identify any such axis. Finally, Appellants note that Fig. 4 apparently shows an embodiment in which the vertical position of the tiltable support surface 12 is made adjustable to apparently control

the tilting angle of the surface 12. However, it is not the case in this embodiment that the support platform 12 can both tilt and rotate with respect to any defined axis, and the Examiner has failed to identify any such axis. It is also not the case that platform 12 can both tilt and move up and down with respect to any defined axis since the vertical movement is merely a position adjustment, i.e., in contrast to Appellants' invention, the platform is not designed to move up and down parallel to a defined axis with such movement being detected by a sensor device in order to generate sensor signals.

In contrast to the invention, the platform 12 in McSHANE is merely angularly displaceably (i.e., tiltably) mounted to the base platform 14 via a convex support 20. Moreover, it is clear from these figures, that the convex support 20 merely allows the platform 12 to rock or angularly tilt relative to a horizontal plane (see col. 4, lines 9-14).

Appellants stress that the platform 12 in McSHANE can pivot to either side about the convex support 20. However, even such pivoting movement cannot be said to also constitute rotation of the platform 12 with respect to a defined axis, and Appellants submit that the Examiner has failed to identify any such axis. Moreover, such movement clearly cannot also be said to constitute up and down movement of the platform 12 with respect to a defined axis and, again, the Examiner has failed to identify any such axis.

Appellants further emphasize that the design of each of these devices is such that they each lack a tiltable platform that can also *either rotate about an axis or move in a direction which is parallel to said axis*, said axis being one of: vertically oriented when the support

surface is oriented horizontally, perpendicular to at least the support surface, running through at least the base part and the support surface when the support surface is not tilted, running through at least the support surface and a tiltable mounting, or running through at least the base part and a tiltable mounting.

Thus, Appellants submit that it is improper to combine LIPPS and McSHANE and it is clear that no proper combination of these documents would result in at least this feature, much less, all the recited features of independent claim 1. Thus, Appellants submit that no proper combination of these documents discloses or suggests the features of at least independent claim 1.

Moreover, even if such a combination were proper, Appellants submit that such combination would, nevertheless, fail to disclose or suggest the invention as recited in at least independent claim 1. As discussed above, each of these documents fails to disclose a tiltable support surface that can *either rotate about an axis or move in a direction which is parallel to said axis*, said axis being one of: vertically oriented when the support surface is oriented horizontally, perpendicular to at least the support surface, running through at least the base part and the support surface when the support surface is not tilted, running through at least the support surface and a tiltable mounting, or running through at least the base part and a tiltable mounting.

Accordingly, Appellants submit that none of the applied documents, alone or in combination, suggest any benefit to utilizing the above-noted features as recited in at least

independent claim 1. Accordingly, because none of the applied documents disclose or suggest utilizing these features, Appellants submit that there is no motivation to modify the above-noted documents in the manner asserted by the Examiner.

Appellants further submit that there is no motivation or rationale disclosed or suggested in the art to combine the references in the manner asserted by the Examiner. Nor does the Examiner's opinion provide a proper basis for these features or for the motivation to modify any of these documents, or their combination, in the manner suggested by the Examiner. Therefore, Appellants submit that the invention as recited in at least independent claim 1 is not rendered obvious by any reasonable inspection of these disclosures.

Because each of LIPPS and McSHANE fails to disclose at least the above-noted features of at least independent claim 1, Appellants submit that no proper combination of these documents discloses or suggests each and every recited feature of the instant invention. Thus, Appellants submit that the Examiner has failed to establish an adequate evidentiary basis to support a rejection of obviousness under 35 U.S.C. § 103(a), and that the instant rejection is improper and should be withdrawn.

Claim 9 depends from claim 1 and further recites that the tilt restoring device comprises at least one compressible element, the at least one compressible element being filled with a compressible medium. This feature has been acknowledged by the Examiner to be lacking in LIPPS. Furthermore, Appellants dispute that the dampers 38 shown in Fig. 2 of McSHANE operate as a tilt restoring device. To the contrary, col. 5, lines 41-51 of

McSHANE indicates that even though these devices may be "pneumatic" (i.e., a compressible medium), they merely function "to provide some resistance to the angular deflection of the balance platform". Such compressible medium resistance devices act to slow a tilting movement of the platform 12. However, unlike Appellants' invention, they do not act to restore the position of the support surface to an original horizontal position.

Claim 13 depends from claim 12, and further recites that the vertical restoring device comprises at least one compressible element, the at least one element being filled with a compressible medium. This feature has been acknowledged by the Examiner to be lacking in LIPPS. Furthermore, Appellants dispute that the dampers 38 shown in Fig. 2 of McSHANE operate as a compressible medium restoring device. To the contrary, col. 5, lines 41-51 of McSHANE indicates that even though these devices may be "pneumatic" (i.e., a compressible medium), they merely function "to provide some resistance to the angular deflection of the balance platform". Such compressible medium resistance devices act to slow a tilting movement of the platform 12. However, unlike Appellants' invention, they do not act to restore the position of the support surface vertically to an original horizontal position.

Claims 14 and 22 stand or fall with independent claim 1 for purposes of this appeal.

Thus, for all reasons given above, reversal of the rejection of claims 9, 13, 14 and 22 is requested.

**iii. Claims 21 and 23 Patentably Define Appellants' Invention; the Rejection Should be Reversed.**

Reversal of the rejection of claims 21 and 23 under 35 U.S.C. 103(a) over LIPPS in view of FURTADO is requested.

Claims 21 and 23 depend from independent claim 1. Therefore, the rejection of these claims should be reversed at least for the reasons given above with regard to the reversal of the rejections of claim 1.

In the rejection, the Examiner acknowledges that LIPPS fails to disclose a bearing device which is tiltable relative to a horizontal axis, at least one retaining loop for retaining a foot on the support surface, and a mechanism for tilting the base structure. However, the Examiner asserted that FURTADO teaches these features and that it would have been obvious to provide these features on the device of LIPPS in order "to obtain the invention as specified in claims". Appellants respectfully traverse the Examiner's assertions and conclusions.

Appellants submit that dependent claims 21 and 23 are not disclosed or suggested by any proper combination of LIPPS and FURTADO. In particular, Appellants submit that no proper combination of LIPPS and FURTADO discloses or suggests the invention as defined by at least independent claim 1.

Notwithstanding the Examiner's assertion as to what these documents disclose, Appellants submit that each of LIPPS and FURTADO fails to disclose, inter alia, that a

support unit comprises a standing part having a support surface and is mounted in a tiltable manner on a base part, wherein the support surface can *either rotate about an axis or move in a direction which is parallel to said axis*, said axis being one of:

vertically oriented when the support surface is oriented horizontally;

perpendicular to at least the support surface; or

running through at least the base part and the support surface when the support surface is not tilted; or

running through at least the support surface and a tiltable mounting; or

running through at least the base part and a tiltable mounting.

Appellants note that each of LIPPS and FURTADO fails to disclose any tiltable support unit which can either rotate or move parallel to an axis as defined in Applicants' claim 1, much less, a tiltable support surface which can *either rotate about the axis or move in a direction which is parallel to the axis.*

As discussed above, it is clear from Figures 3-6 in LIPPS that the support platform 26 cannot tilt and rotate with respect to any defined axis, and the Examiner has failed to identify any such axis. It is also equally clear that the platform 26 cannot both tilt and move up and down with respect to any defined axis, and, again, the Examiner has failed to identify any such axis.

In contrast to the invention, the platform 26 in LIPPS is merely pivotally mounted to the mounting plate 24 via front and rear pivot supports 31 and 32 (hence the name "pivot

supports"). Moreover, it is clear from these figures, that front pivot support 31 is structurally different from rear pivot support 32, and that these differences are such that they allow front and rear ends 50 and 52 of the platform 26 to pivot about a single pivot support, i.e., the rear pivot support 32.

Moreover, it is clear from Figure 16 and col. 33, lines 3-14 in FURTADO that the support platform 14 can only pivot or swivel, rather than being able to both tilt and rotate with respect to an axis as defined in Applicants' claim 1, and the Examiner has failed to identify any such axis. It is also equally clear that the platform 40 also cannot both tilt and move up and down with respect to any such defined axis, and, again, the Examiner has failed to identify any such axis.

In contrast to the invention, the platform 40 in FURTADO is merely angularly movable upward or downward (see col. 33, lines 3-6). Moreover, it is clear from Figure 16, that the platform 40 only pivots about an axis defined by a horizontal pivot point 244, i.e., the platform 40 is allowed to angularly tilt relative to a horizontal plane via pivot 244.

Appellants note that even assuming the device in FURTADO has a platform 40 which can be said to both rotate (which is not shown in Fig. 16) and pivot to one side (which is shown in Fig. 16), such pivoting movement cannot be said to constitute both a tilting movement and a rotation of the platform 40 with respect to an axis as defined in claim 1, and Appellants submit that the Examiner has failed to identify any such axis. Moreover, such movement also cannot be said to constitute both a tilting movement and up and down

movement of the platform 40 with respect to the defined axis and, again, the Examiner has failed to identify any such axis.

Appellants emphasize that the design of each of these devices is such that they each lack a tilting platform that can *either rotate about an axis or move in a direction which is parallel to said axis*, said axis being one of: vertically oriented when the support surface is oriented horizontally, perpendicular to at least the support surface, running through at least the base part and the support surface when the support surface is not tilted, running through at least the support surface and a tiltable mounting, or running through at least the base part and a tiltable mounting.

Thus, Appellants submit that it is improper to combine LIPPS and FURTADO and it is clear that no proper combination of these documents would disclose at least these features, much less, all the recited features of independent claim 1. Thus, Appellants submit that no proper combination of these documents discloses or suggests the features of at least independent claim 1.

Moreover, even if such a combination were proper, Appellants submit that such combination would, nevertheless, fail to disclose or suggest the invention as recited in at least independent claim 1. As discussed above, each of these documents fails to disclose a tiltable support surface that can *either rotate about an axis or move in a direction which is parallel to said axis*, said axis being one of: vertically oriented when the support surface is oriented horizontally, perpendicular to at least the support surface, running through at least the base

part and the support surface when the support surface is not tilted, running through at least the support surface and a tiltable mounting, or running through at least the base part and a tiltable mounting.

Appellants further submit that none of the applied documents, alone or in combination, suggest any benefit to utilizing the above-noted features as recited in at least independent claim 1. Accordingly, because none of the applied documents disclose or suggest utilizing these features, Appellants submit that there is no motivation to modify the above-noted documents in the manner asserted by the Examiner.

Again, Appellants submit that there is no motivation or rationale disclosed or suggested in the art to combine the references in the manner asserted by the Examiner. Nor does the Examiner's opinion provide a proper basis for these features or for the motivation to modify any of these documents, or their combination, in the manner suggested by the Examiner. Therefore, Appellants submit that the invention as recited in at least independent claim 1 is not rendered obvious by any reasonable inspection of these disclosures.

Because each of LIPPS and FURTADO fail to disclose at least the above-noted features of at least independent claim 1, Appellants submit that no proper combination of these documents discloses or suggests each and every recited feature of the instant invention. Thus, Appellants submit that the Examiner has failed to establish an adequate evidentiary basis to support a rejection of obviousness under 35 U.S.C. § 103(a), and that the instant rejection is improper and should be withdrawn.

Furthermore, claims 21 and 23 each depend from claim 1 and further recite, respectively, that the bearing device is variably moveable from an initial position relative to a foundation and further comprising at least one retaining loop or tie for retaining a foot of the user on the support surface. As acknowledged by the Examiner, these features are lacking in LIPPS. However, even if these features were taught by FURTADO, Appellants submit that there is no motivation to combine these documents so as to render the entire combination of features recited in these claims unpatentable, and further submit that the Examiner's asserted motivation is improperly based upon Appellants' disclosure.

Thus, for all the reasons given above, reversal of the rejection of claims 21 and 23 is requested.

**iv. Claim 24 Patentably Defines Appellants' Invention; the Rejection Should be Reversed.**

Reversal of the rejection of claim 24 under 35 U.S.C. 103(a) over LIPPS in view of WARD is requested.

Claim 24 depends from independent claim 1. Therefore, the rejection of these claims should be reversed at least for the reasons given above with regard to the reversal of the rejections of claim 1.

In the rejection, the Examiner acknowledges that LIPPS fails to disclose an optoelectronic sensor device. However, the Examiner asserted that WARD teaches this

feature and that it would have been obvious to provide this feature on the device of LIPPS because LIPPS teaches that other types of sensors may be used as a matter of design choice. Appellants respectfully traverse the Examiner's assertions and conclusions.

Appellants submit that dependent claim 24 is not disclosed or suggested by any proper combination of LIPPS and WARD. Specifically, Appellants submit that no proper combination of LIPPS and WARD discloses or suggests the invention as defined by at least independent claim 1.

Notwithstanding the Examiner's assertion as to what these documents disclose, Appellants submit that each of LIPPS and WARD fails to disclose, inter alia, that a support unit comprises a standing part having a support surface and is mounted in a tiltable manner on a base part, wherein the support surface can *either rotate about an axis or move in a direction which is parallel to said axis*, said axis being one of:

vertically oriented when the support surface is oriented horizontally;

perpendicular to at least the support surface; or

running through at least the base part and the support surface when the support surface is not tilted; or

running through at least the support surface and a tiltable mounting; or

running through at least the base part and a tiltable mounting.

Appellants note that each of LIPPS and WARD fails to disclose any tiltable support unit which can either rotate or move parallel to an axis as defined in Applicants' claim 1,

much less, a tiltable support surface which can *either rotate about the axis or move in a direction which is parallel to the axis.*

As discussed above, it is clear from Figures 3-6 of LIPPS that the support platform 26 cannot both tilt and rotate with respect to any defined axis, and the Examiner has failed to identify any such axis. It is also equally clear that the platform 26 cannot both tilt and move up and down with respect to any defined axis, and, again, the Examiner has failed to identify any such axis.

In contrast to the invention, the platform 26 in LIPPS is merely pivotally mounted to the mounting plate 24 via front and rear pivot supports 31 and 32 (hence the name "pivot supports"). Moreover, it is clear from these figures, that front pivot support 31 is structurally different from rear pivot support 32, and that these differences are such that they allow front and rear ends 50 and 52 of the platform 26 to pivot about a single pivot support, i.e., the rear pivot support 32.

Moreover, it is clear from Figs. 4-6 of WARD that the support platform 26 cannot tilt in any manner. This support surface 26 can only rotate about a Z axis and move horizontally in X and Y directions. Such a platform 26 clearly cannot both tilt and rotate with respect to an axis as defined in Applicants' claim 1, and the Examiner has failed to identify any such axis. It is also equally clear that the platform 26 cannot move up and down, much less, tilt and move up and down with respect to any such defined axis, and, again, the Examiner has failed to identify any such axis.

In contrast to the invention, the platform 26 in WARD is merely horizontally movable, not tiltable and rotatable or tiltable and movable up and down.

Appellants emphasize that the design of each of these devices is such that they each lack a platform that can both tilt and *either rotate about an axis or move in a direction which is parallel to said axis*, said axis being one of: vertically oriented when the support surface is oriented horizontally, perpendicular to at least the support surface, running through at least the base part and the support surface when the support surface is not tilted, running through at least the support surface and a tiltable mounting, or running through at least the base part and a tiltable mounting.

Specifically, Appellants submit that it is improper to combine LIPPS and WARD and it is clear that no proper combination of these documents would disclose at least this feature, much less, all the recited features of independent claim 1. Thus, Appellants submit that no proper combination of these documents discloses or suggests the features of at least independent claim 1.

Moreover, even if such a combination were proper, Appellants submit that such combination would nevertheless fail to disclose or suggest the invention as recited in at least independent claim 1. As discussed above, each of these documents fails to disclose a tiltable support surface that cannot *either rotate about an axis or move in a direction which is parallel to said axis*, said axis being one of: vertically oriented when the support surface is oriented horizontally, perpendicular to at least the support surface, running through at least

the base part and the support surface when the support surface is not tilted, running through at least the support surface and a tiltable mounting, or running through at least the base part and a tiltable mounting.

Accordingly, Appellants submit that none of the applied documents, alone or in combination, suggest any benefit to utilizing the above-noted features as recited in at least independent claim 1. Accordingly, because none of the applied documents disclose or suggest utilizing these features, Appellants submit that there is no motivation to modify the above-noted documents in the manner asserted by the Examiner.

Thus, Appellants again submit that there is no motivation or rationale disclosed or suggested in the art to combine the references in the manner asserted by the Examiner. Nor does the Examiner's opinion provide a proper basis for these features or for the motivation to modify any of these documents, or their combination, in the manner suggested by the Examiner. Therefore, Appellants submit that the invention as recited in at least independent claim 1 is not rendered obvious by any reasonable inspection of these disclosures.

Because each of LIPPS and WARD fail to disclose at least the above-noted features of at least independent claim 1, Appellants submit that no proper combination of these documents discloses or suggests each and every recited feature of the instant invention. Thus, Appellants submit that the Examiner has failed to establish an adequate evidentiary basis to support a rejection of obviousness under 35 U.S.C. § 103(a), and that the instant rejection is improper and should be withdrawn.

Furthermore, claim 24 depends from claim 1 and further recites that the sensor device comprises an optoelectronic sensor device. As acknowledged by the Examiner, this feature is lacking in LIPPS. Furthermore, even if this feature were taught by WARD, Appellants submit that there is no motivation to combine these documents so as to render the entire combination of features recited in this claim unpatentable, and further submit that the Examiner's asserted motivation for combining these documents is improperly based upon Appellants' disclosure.

Thus, for all the reasons given above, reversal of the rejection of claim 24 is requested.

## I. CONCLUSION

For the reasons advanced above, Appellants submit that the rejections are erroneous and should be reversed.

This appeal brief is being submitted in triplicate, pursuant to 37 CAR 1.192(a).

A check is enclosed in the amount of $155.00 for payment of the fee for filing an appeal brief, as set forth in 37 CAR 1.17(c).

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The Commissioner is authorized to charge any additional fee, or to credit any overpayment, to Deposit Account No. 19-0089.

Respectfully submitted,
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Attachment: Appendix

P18446.A11

## APPENDIX

CLAIMS ON APPEAL:

1. (Twice Amended) A device for detecting certain states of movement of a body of a user and for generating signals corresponding to a result of a detection for subsequent processing in a data processing system, comprising:

a bearing device for supporting the body of the user;

said bearing device further comprising a support unit mounted in a tiltable manner on a base part;

said support unit comprising a standing part;

said standing part having a support surface for supporting the body of the user; and

a sensor device for detecting a direction and a magnitude of a position of a projection of the body's center of gravity into the support surface relative to a predetermined original position in the support surface,

wherein the direction and the magnitude of the tilt of the support surface are detected for generating corresponding sensor signals,

wherein the support surface is mounted on the base part of said bearing device such that it can either rotate about an axis or move in a direction which is parallel to said axis,

said axis being one of:

vertically oriented when the support surface is oriented horizontally,

perpendicular to at least the support surface,

running through at least the base part and the support surface when the support surface is not tilted,

running through at least the support surface and a tiltable mounting, or

running through at least the base part and a tiltable mounting,

wherein the sensor device detects either the direction and the magnitude of a rotational movement of the body of the user about the axis or detects at least the magnitude of a vertical

movement of the body's center of gravity, and generates corresponding sensor signals.

8. (Amended) The device of claim 1, further comprising a tilt restoring device for opposing a tilting of the support surface.

9. (Amended) The device of claim 8, wherein the tilt restoring device comprises at least one compressible element, the at least one compressible element being filled with a compressible medium.

12. (Amended) The device of claim 1, further comprising a restoring device for opposing a vertical movement of the support surface.

13. (Amended) The device of claim 12, wherein the vertical restoring device comprises at least one compressible element, the at least one element being filled with a compressible medium.

14. (Amended) The device of claim 12, wherein the restoring device is variable.

21. (Amended) The device of claim 1, wherein the bearing device is variably moveable from an initial position relative to a foundation.

22. (Amended) The device of claim 1, wherein the support surface comprises a non-slip surface coating.

23. (Amended) The device of claim 1, further comprising at least one retaining loop or tie for retaining a foot of the user on the support surface.

24. (Amended) The device of claim 1, wherein the sensor device comprises an optoelectronic sensor device.

25. (Amended) The device of claim 1, further comprising at least one connection for connecting a further device for detecting movements of the user.

26. (Amended) The device of claim 1, further comprising at least one connection for connecting one of a visual and acoustic output unit.

27. (Amended) The device of claim 25, wherein the at least one connection comprises a standardized interface for a data processing system, the standardized interface being one of a serial or parallel interface.

# Exhibit 13

US005283555A

# United States Patent [19]

**Ward et al.**

[11] **Patent Number: 5,283,555**

[45] **Date of Patent: Feb. 1, 1994**

[54] **DIMENSIONAL CONTINUOUS MOTION CONTROLLER**

[75] Inventors: **Peter Ward**, Kingston, N.Y.; **David Ward**, Apex, N.C.

[73] Assignee: **PanDigital Corp.**, Kingston, N.Y.

[21] Appl. No.: **842,778**

[22] Filed: **Feb. 21, 1992**

**Related U.S. Application Data**

[63] Continuation of Ser. No. 503,999, Apr. 4, 1990, abandoned.

[51] **Int. Cl.**[5] ..... **G09G 3/02**

[52] **U.S. Cl.** ..... **345/156;** 400/475; 74/471 XY

[58] **Field of Search** ..... 340/706, 709, 710; 273/85 B, 85 D, 85 Z, 85 F, 85 G, 148 B, 438; 400/475; 200/86.5; 74/471 XY; 250/221

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| 4,879,556 | 11/1989 | Duimel | 340/709 |
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| | | | |
|---|---|---|---|
| 2038597 | 7/1980 | United Kingdom | . |

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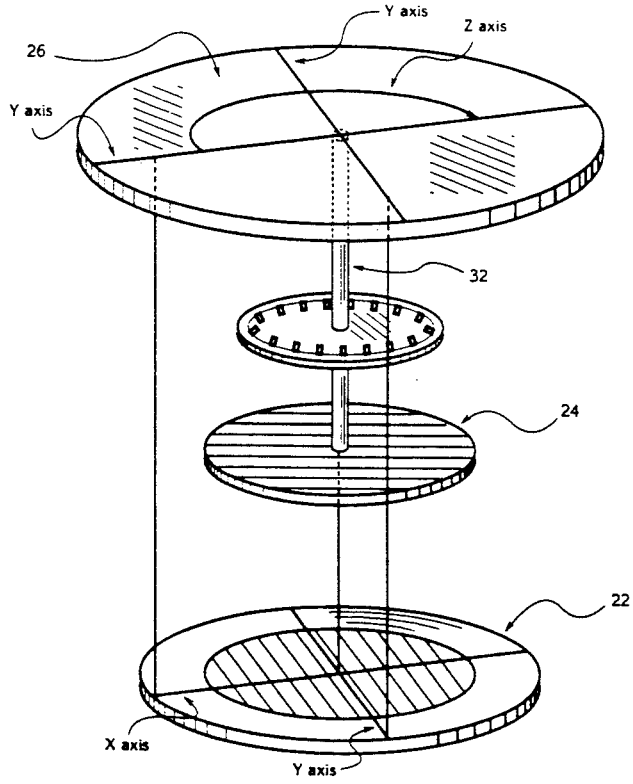
*Primary Examiner*—Alvin E. Oberley
*Assistant Examiner*—Regina Liang

[57] **ABSTRACT**

A stationary flat horizontal support member has an active circular area with a center point which defines a zero point of intersecting orthogonal X and Y axes. A first flat horizontal plate is disposed above and spaced from the member. The first plate is movable along either or both X and Y axes which are vertically aligned with the corresponding X and Y axes of the member. The first plate has an active circular area with a center and having a home position at which the center of the first plate is vertically aligned with the center point. The first plate is supported above the member in such manner that the first plate can be moved and held in an position with respect to either one or both of the X and y axes by an operator in an almost frictionless manner. Once the operator releases the hold, the first plate is automatically returned to zero position. A first dispacement signal monatonically related to the displacement of the center of the first plate from the center point of the member along the X axis and a second displacement signal monatonically related to the displacement of the center of the first plate from the center point of the member along the Y axis are both produced.

**12 Claims, 6 Drawing Sheets**



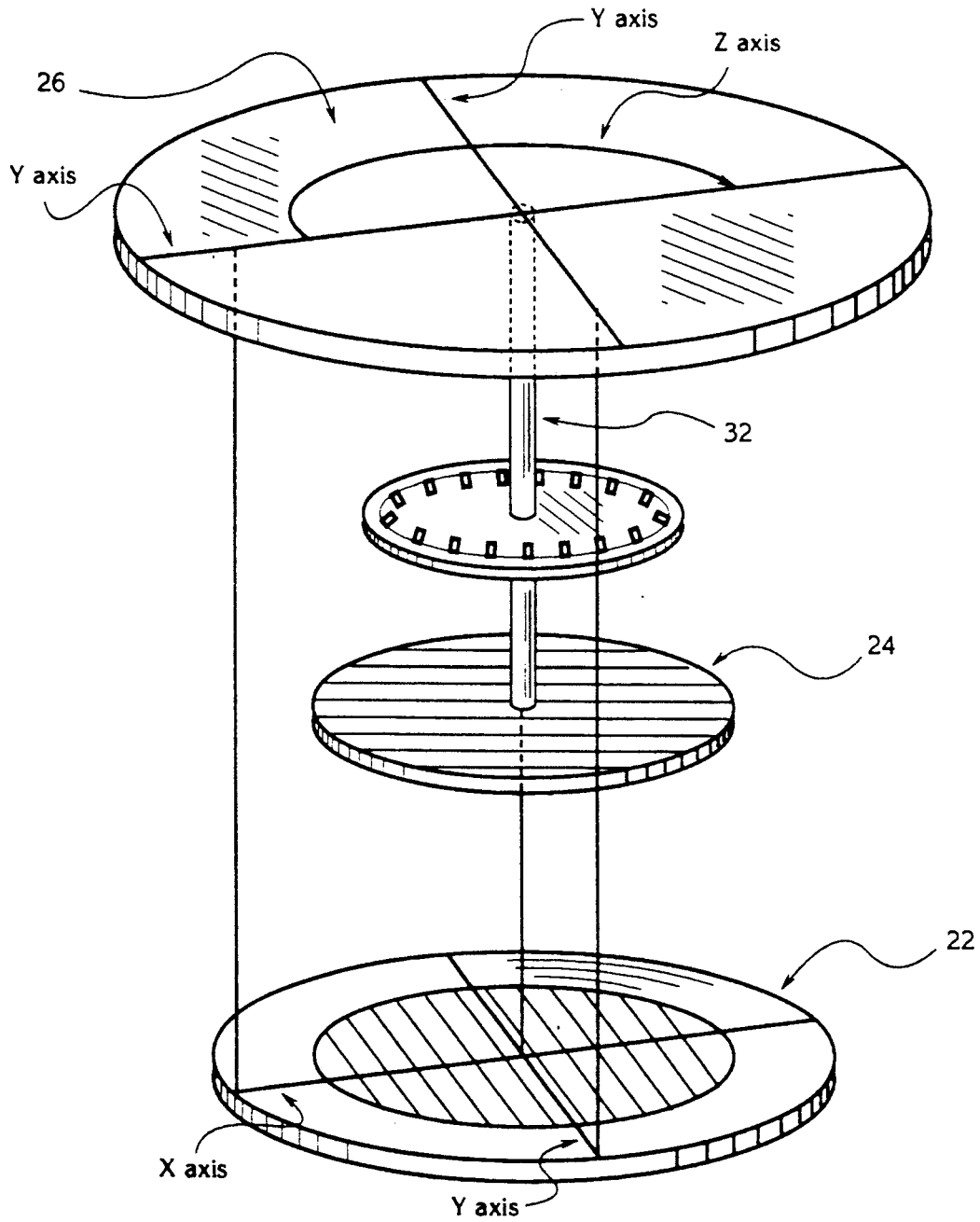



Fig. 1

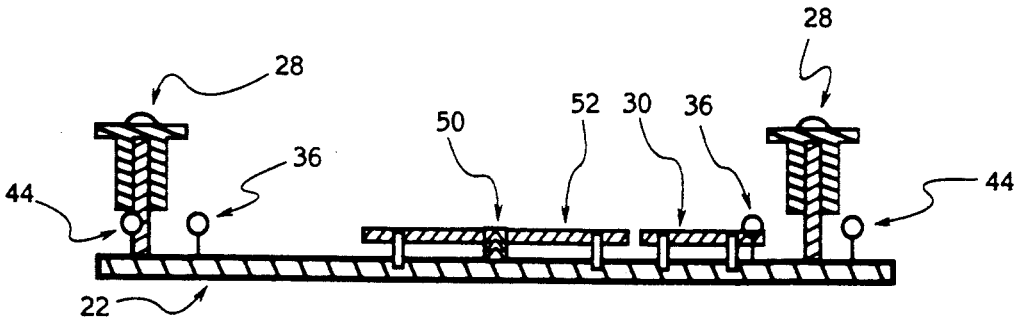



Fig. 2

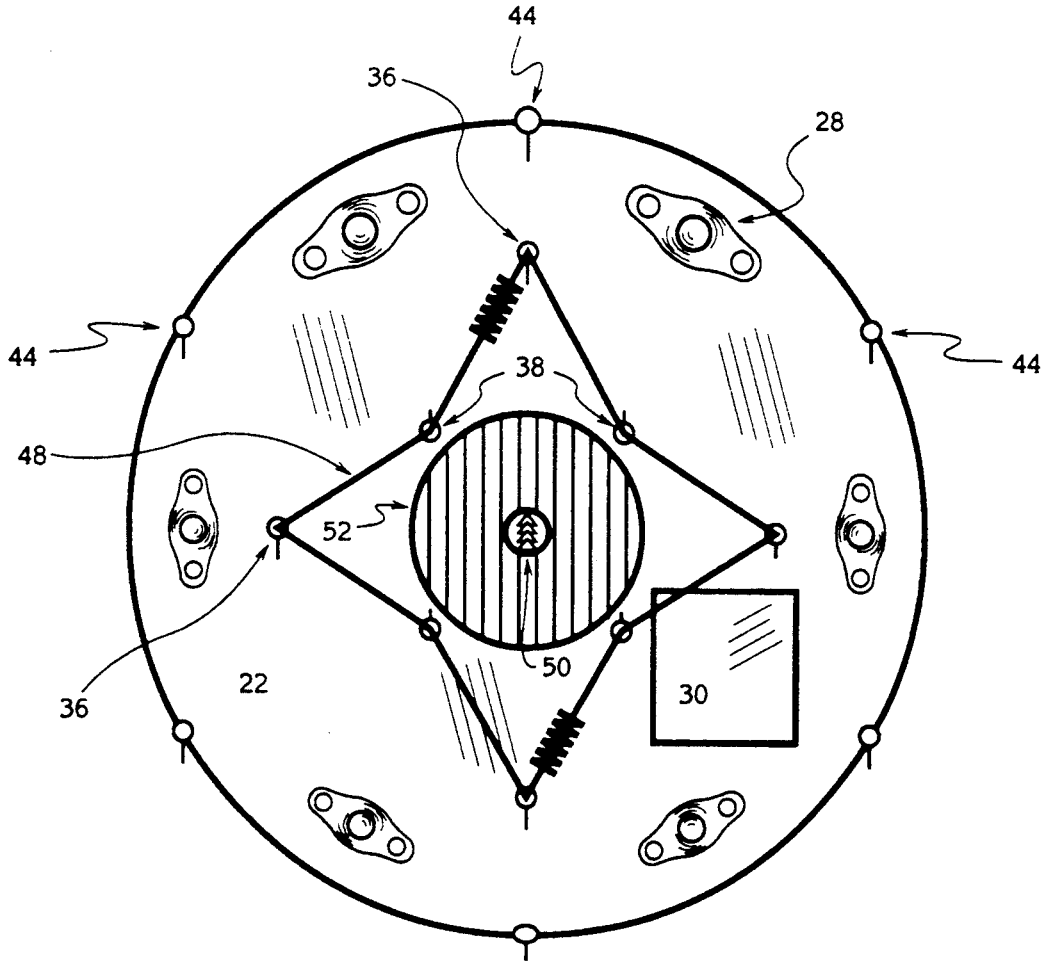



Fig. 3

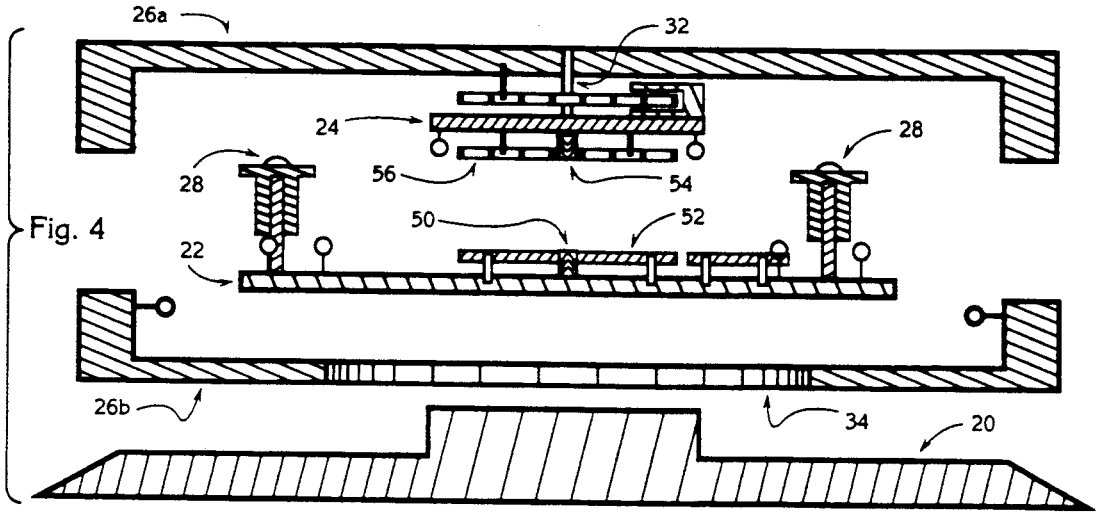



Fig. 4

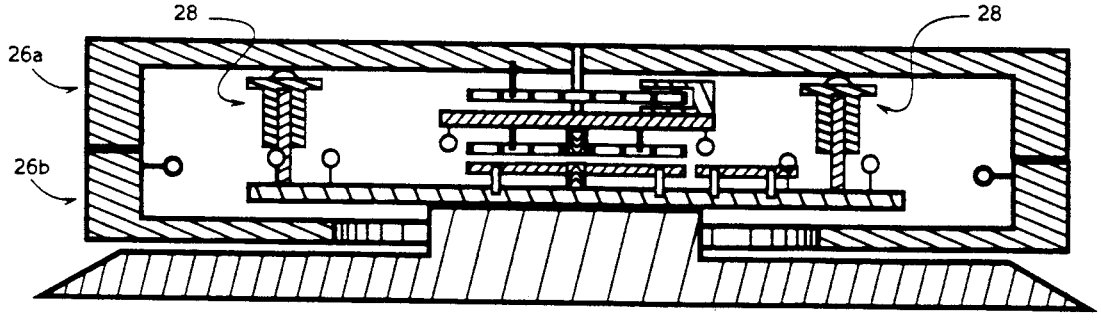



Fig. 5

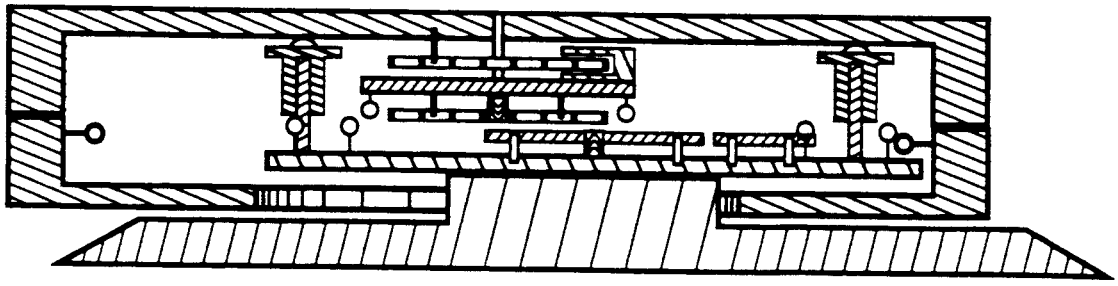


Fig. 6

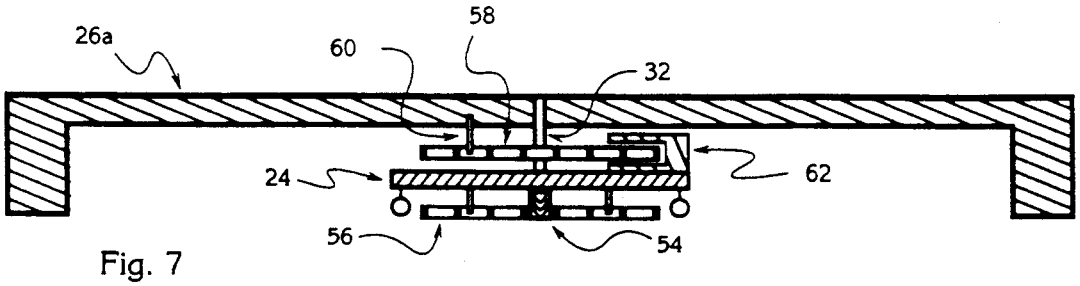



Fig. 7

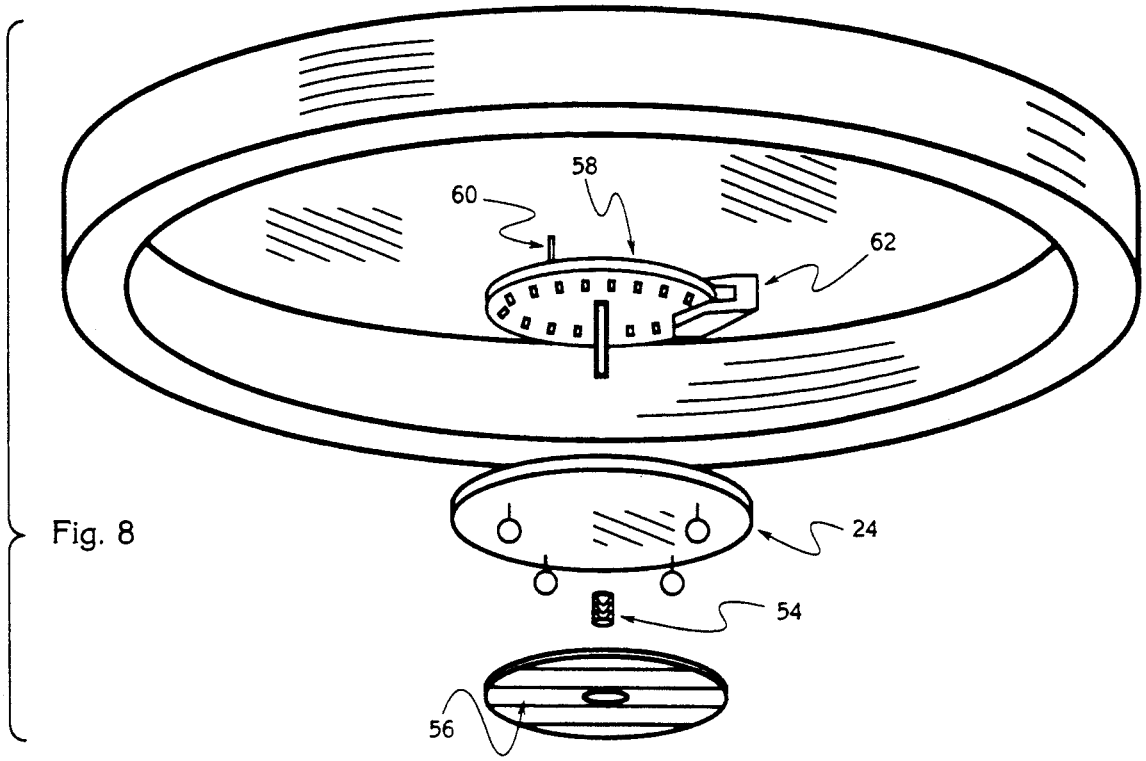



Fig. 8

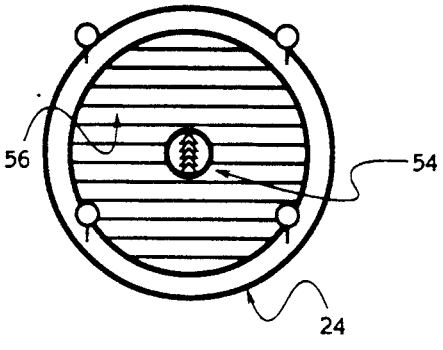



Fig. 9

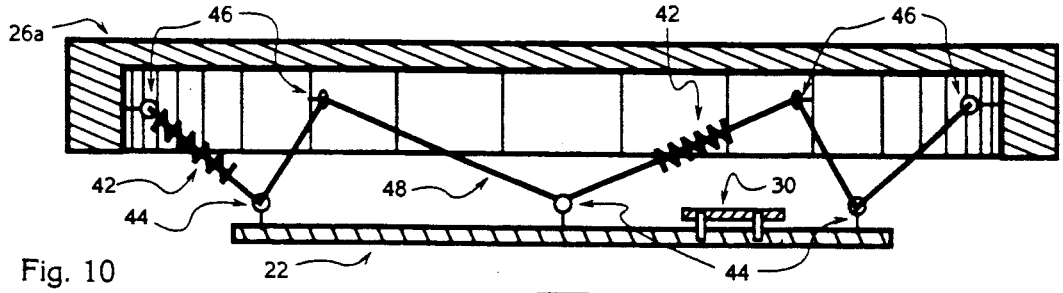



Fig. 10

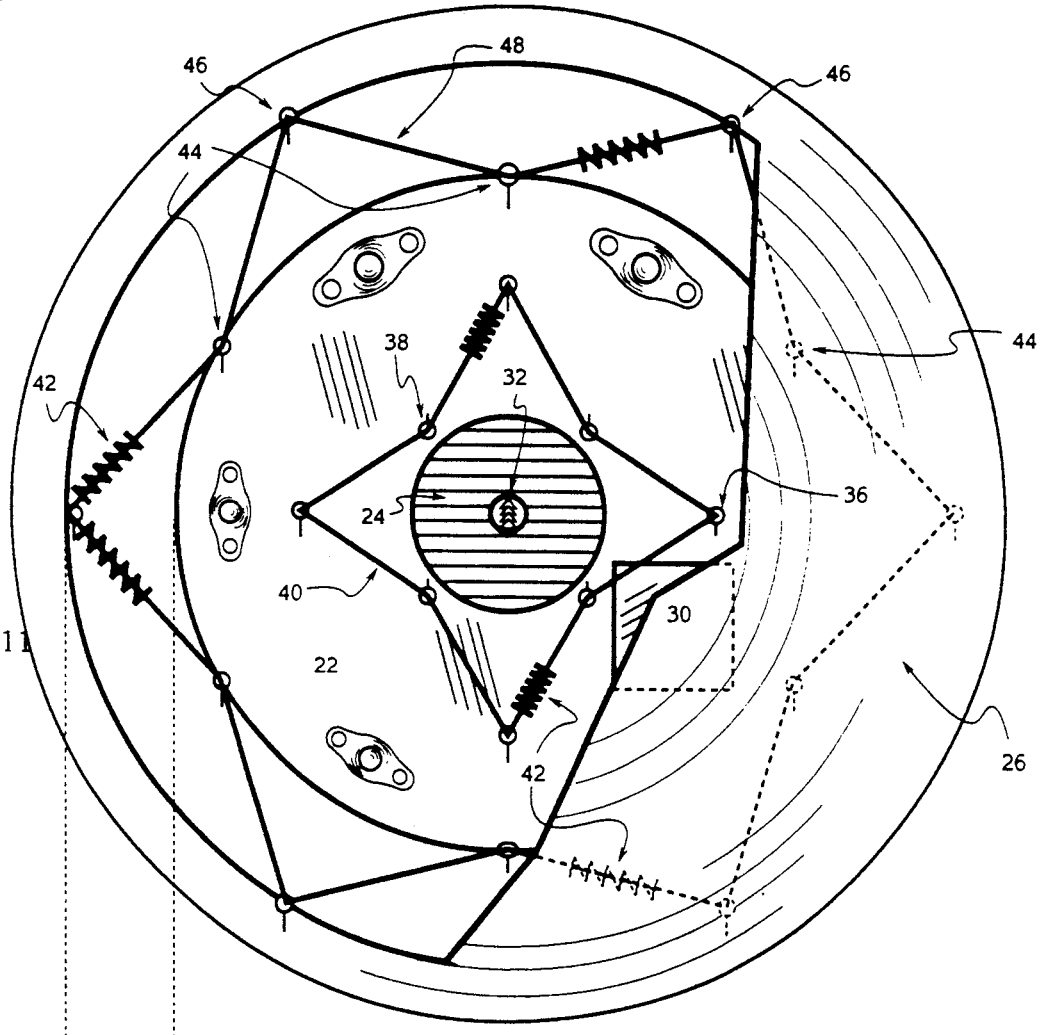



Fig. 11

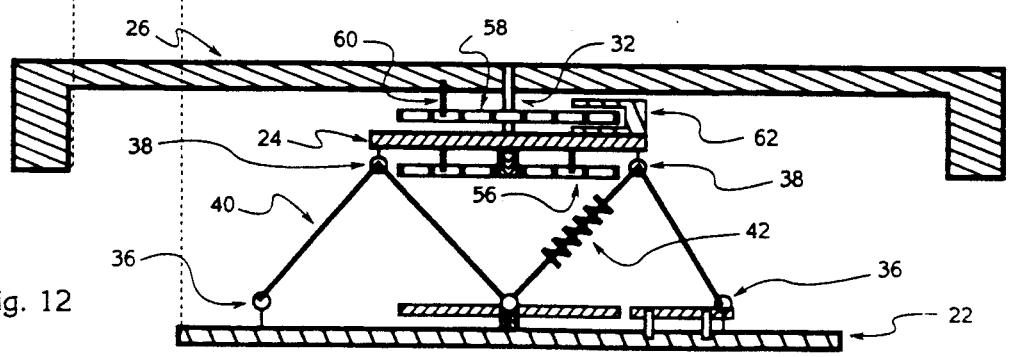



Fig. 12

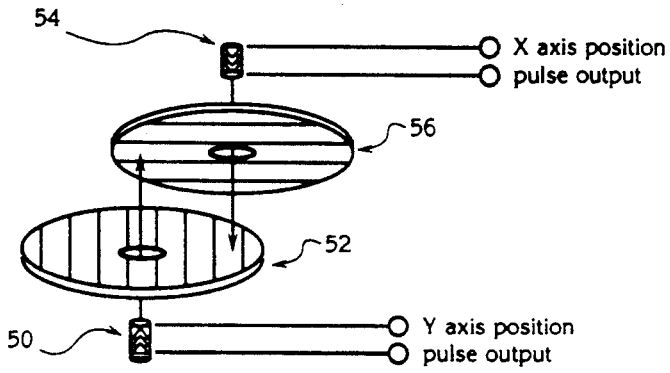



Fig. 13

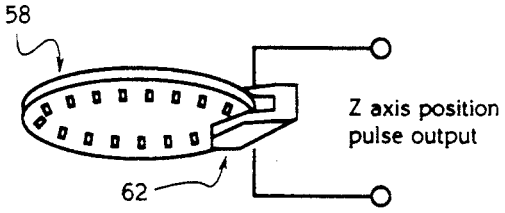



Fig. 14

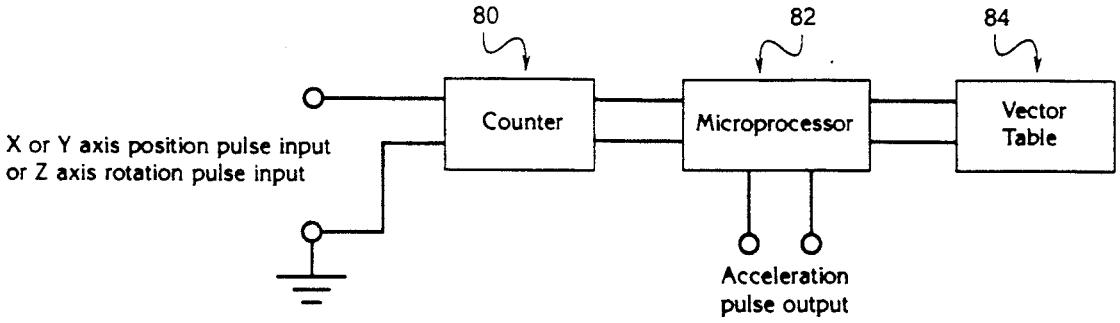



Fig. 15

# DIMENSIONAL CONTINUOUS MOTION CONTROLLER

This is a continuation of application Ser. No. 07/503,999 filed on Apr. 4, 1990 , now abandoned.

## BACKGROUND OF THE INVENTION

Many computers use a hand operated pointer device such as a mouse, trackball or joystick to manipulate graphics, menus, windows and the like in combination with a keyboard. Since the user employs both the device and the keyboard, it is necessary to move a hand back and forth between keyboard and device, a time consuming and awkward operation.

If such devices could be operated using a foot rather than the hand of the operator, this operation could be eliminated. However, the inventors found that no known device could be successfully operated by foot. The mouse, conventionally supported on a pad, initially functioned well until the mouse ran off the pad, with no way for the operator to pick it up without using his hand. The pad and mouse became dirty and unusable quickly unless frequent cleaning steps were employed. The trackball became clogged with dirt and inoperative almost immediately during use. The joystick was not adaptable for foot operation.

The present invention is directed toward a new type of device, a dimensional continuous motion controller, which can be easily operated either by hand or by foot, and, when operated by foot, eliminates the awkward and time consuming hand operation described above.

## SUMMARY OF THE INVENTION

It is an object of the present invention to provide a new device, a dimensional continuous motion controller, which can be easily operated either by hand or by foot, and when operated by foot, enables a computer operator to continuously operate the keyboard and the device, either sequentially or successively, while eliminating awkward and continuous hand operations.

Another object is to provide a new device, a dimensional controller, which operates on the principal of acceleration rather than proportional physical displacement, whereby the object moves continuously without corresponding continuous motion of the controller.

Still another object is to provide a new device, a dimensional controller, which does not require continuous movement of the controller to produce continuous motion of the pointer, but rather requires a single positioning action of the controller to produce such continuous motion.

These and other objects and advantages of the invention will either be explained or will become apparent hereinafter.

In accordance with the principles of the invention, the dimensional controller may be used for one, two or three dimensional control actions.

For two dimensional control action, the controller employs a stationary flat horizontal support member having an active circular area with a center point which defines a zero point of intersecting orthogonal X and Y axes.

A first flat horizontal plate is disposed above and spaced from the member. The first plate is movable along either or both X and Y axes which are vertically aligned with the corresponding X and Y axes of the member. The first plate has an active circular area with a center and having a home position at which the center of the first plate is vertically aligned with the center point.



First means supports the first plate above the member in such manner that the first plate can be moved and held in an position with respect to either one or both of the X and Y axes by an operator in an almost frictionless manner. Once the operator releases the hold, the first plate is automatically returned to home position.

Second means coupled to both the first plate and the member produces a first dispacement signal which is monotonically related to the displacement of the center of the first plate from the center point of the member along the X axis and a second displacement signal which is monotonically related to the displacement of the center of the first plate from the center point of the member along the Y axis.

Additional means are responsive to the first signal to produce a third acceleration signal monotonically related to an acceleration value proportional to the amount of displacement along the X axis and are also responsive to the second signal to produce a fourth acceleration signal monotonically related to an accelation value proportional to the amount of displacement along the Y axis. When the first plate is returned to home position, all signals have a zero value.

When the controller is to be used with a computer to move a cursor displayed on a monitor screen from one point to a second point, the operator, using hand or foot operation, places the first plate in a position to describe a straight line path between the two points, and holds the plate in this position until the pointer has moved along this path from one point to the second point. When the cursor has reached to the second point, the operator releases the plate. The plate returns to home position, all controller signals attain zero values, and the pointer remains at the second point.

If desired, the controller described above can be used for one dimensional control action by using on-off switches or other means to eliminate either one of the first and second displacement signals and the corresponding one of the third and fourth acceleration signals, whereby the remaining signals relate only to movement in a selected one of the X and Y axes.

For three dimensional control action, the two dimensional structure described above is augmented in the following manner.

A second flat horizontal plate is disposed above and spaced from the first plate. The second plate is freely movable in a horizontal plane along either or both X and Y axes which are vertically aligned with the corresponding X and Y axes of the member. The second plate has an active circular area with a center and is rotatable about a vertical axis, the Z axis, which extends through the center of the second plate. The second plate having a home position at which the center of the second plate is vertically aligned with the center point and at which the angle of rotation is at 0 degrees.

A vertical spindle interconnects the centers of the first and second plates, the second plate being rotatable about the spindle, the first plate being non-rotatable about the spindle. Consequently, movement of the second plate along either or both X and Y axes produces like movement in the horizontal plane of the first plate but rotation of the second plate about the Z axis produces no rotation of the first plate.

The same almost frictionless action is employed in both two and three dimensional control actions. How-

ever, for three dimensional control action, the second plate, rather than the first plate, is moved by the operator and first, second and third displacement signals respectively responsive to the combined linear and rotational movement are produced.

The first positional signal is monotonically related to the displacement of the center of the second plate from the center point of the member along the X axis. The second positional signal is monotonically related to the displacement of the center of the first plate from the center point of the member along the Y axis. The third positional signal is monotonically related to the degree of angular rotation of the second plate about the Z axis as measured from the home position.

In the same manner as before, fourth, fifth and sixth acceleration signals are produced. The fourth acceleration signal is monotonically related to an acceleration value proportional to the amount of displacement of the second plate along the X axis. The fifth acceleration signal is monatonically related to an acceleration value proportional to the amount of displacement of the second plate along the Y axis. The sixth acceleration signal is monotonically related to an acceleration value proportional to the degree of angular rotation of the second plate about the Z axis.

The various signals are produced when the operator appropriately positions the second plate and holds it in position. When the operator hold is released, the plates return automatically to home position, and all signals attain zero values.

Three different parameters of computers or other apparatus can be controlled in this manner.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective diagramatic view of two movable plates, stationary member, and related structure as used in a preferred embodiment of the invention.

FIG. **2** is a side view of the stationary support and associated structure.

FIG. **3** is a top view of the structure shown in FIG. **2**.

FIG. **4** is an exploded view of all of the plates, stationary member and associated structure as used in the preferred embodiment.

FIG. **5** is an assembled cross sectional side view of the arrangement of FIG. **5** as shown in home position.

FIG. **6** is a view similar to FIG. **5** but showing the arrangement in off center position.

FIG. **7** is a cross sectional side view of the top plate assembly.

FIG. **8** is a perspective view of the assembly of FIG. **7**.

FIG. **9** is a bottom view of the top plate shown in FIGS. **7** and **8**.

FIG. **10** is a cross sectional side view of the connecting spring network for the member and top plate.

FIG. **11** shows both spring networks.

FIG. **12** is a top view of the connecting spring network for the member and the center plate.

FIG. **13** illustrates diagrammatically the production of position signals for X and Y axes.

FIG. **14** illustrates diagrammatically the production of position signals for Z axis.

FIG. **15** is a block diagram of the system for converting position signals to acceleration signals.

## DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring now to FIG. **1**, a horizontal top plate **26** is movable in a horizontal XV plane in any direction with respect to the surface of a bottom stationary member **22**. Another horizontal plate **24** is disposed between plate **26** and member **22**. The plates and members are circular and, as will be explained below, when the plates are in the home position, their centers are vertically aligned with the center of member **22**. A vertical spindle **32** is connected between the centers of plates **26** and **24**. Plate **26** is freely rotatable about the spindle. Plate **24** is non-rotatably connected to the spindle. The center of member **22** defines the center of the XY coordinate system for the entire structure.

As shown in FIGS. **2** and **3**, member **22** supports caster bearings **28**, eye hooks **44** for tension network to plate **26**, eye hooks **36** for tension network to plate **24**, and a circular plate **52** carrying lines parallel to the Y axis. Plate **52** has a central opening in which optical transmitter-receiver **50** is disposed.

As shown in FIGS. **4–6**, plate **26** has upper and lower mating halves **26***a* and **26***b* which together define a hollow cylinder. Half **26***b* has a large circular opening **34** through which extends a pedestal **20**. Member **22** is supported on pedestal **20**. Because of the opening **34**, plate **26** together with plate **24** can move freely in the XY plane. Plate **26** is freely rotatable about spindle **32** since the spindle is journalled within a bearing. Plate **24** is secured to the spindle. FIGS. **4–6** also show the lower plate assembly which is shown in more detail in FIGS. **7–9**.

As shown in FIGS. **7–9**, an optically encoded circular plate **56** is attached at its center to the center of the lower surface of plate **24**. Plate **56** has a central opening in which an optical transmitter-receiver **54** is disposed. A disc **58** centered on the spindle and rotating therewith has spaced apart peripherally disposed openings for tracking rotation. A vertical support **60** secures disc **58** to plate **26***a* to prevent relative rotation of disc and plate. A unit **62** has a slot through which the disc is rotated with a light source **63** disposed adjacent the top surface of the slot and a photodector **65** disposed adjacent the bottom surface of the slot.

As shown in FIGS. **10–12**, there are two tension wire networks and springs used in interconnecting the plates and member. The first network **48** is connected between eye hooks **46** on half **26***a* and eye hooks **44** on member **22**. Both ends of the wire are connected by springs **40**. If necessary, other parts of the wire strand can be separated at certain other points by additional springs. The second wire network **40** is connected between hooks **38** on plate **24** and hooks **36** on member **22**.

The network **48** serves to bring plate **26** to home position when the operator releases or lets go of plate **26** and yet does not exert too much pressure to make difficulties for the operator. The network **40** restricts the motion of the plate **24** to the horizontal plane and prevents rotation of the spindle.

The transmitter-receiver units **50** and **54** have top light emitting sections and bottom photocell receiving sections. Each unit functions by directing light, in the case of unit **50** upon plate **56**, and in the case of unit **54** upon plate **52**. The manner in which the light is reflected from the plate or film back to the appropriate photocell receiving section enables the production of the various positional signals. The acceleration signals

are derived from the positional signals. More particularly, as shown in FIG. **13**, both plates **52** and **56** carry parallel equidistantly spaced light reflective lines. They are rotated at right angles relative to each other so that plate **56** carries lines parallel to the X axis and plate **52** carries lines parallel to the Y axis. Initially when the plates and member are in home position, light directed from the light source onto the opposite plate surface does not strike any reflective line. However, with movement along either or both X and Y axes, the light strikes the appropriate lines and the reflected light causes the appropriate photodetector to produce pulses, the number of pulses being identical to the number of lines, and thus designating the distance moved as a position signal. If either one of the units **50** or **54** is removed or disconnected, the position signals can be used to designate distance moved along only one of the X and Y axes rather than designates distance moved along both axes.

FIG. **14** illustrates the generation of the rotation along the Z axis. This structure is also shown in FIG. **9**. Disc **58** is centered on spindle **32** which defines the Z axis.

FIG. **15** illustrates a system for converting position signals designated by the number of pulses to acceleration signals. Three identical systems are used, one for each axis. As a position signal represented by a number of pulses is received, a counter **80** counts the number of pulses and produces a coded output identifying the number of pulses. This output is fed to a micro processor **82**. A vector table memory unit **84** contains a conversion table which identifies a different acceleration output signal in pulse form for each position signal, the acceleration signals being monatonically related to the position signals, so that as the position increases, the acceleration signal also increases. The micro processor requests the memory unit to identify the acceleration signal corresponding to the position signal supplied to the micro processor and then produces the signal so identified.

As shown in FIG. **14**, as disc **58** is rotated, a light beam between the light source and the detector is interrupted when a solid portion of the disc passes therebetween and passes between the source and the detector when a hole in the disc passes therebetween. The number of pulses enables a positional signal to be produced. An acceleration signal is derived from the positional signal using the system shown in FIG. **15**.

A switch on the controller when not depressed holds all values at zero. The inclusion of this function allows for sudden stops and more tolerance for error in moving the plate to center. It also enables the operator to relax the foot when no motion is desired since, without the switch, any movement of the operator's foot might cause undesirable cursor movement.

While the invention has been described with particular reference to the preferred embodiment and the drawings, the protection sought is to be limited only by the terms of the claims which follow.

What is claimed is:

**1**. A dimensional continuous motion controller device including structure comprising:

a stationary flat horizontal support member lying in a first horizontal plane and having an active circular area with a center point which defines a zero point of intersecting orthogonal X and Y axes lying in the first plane;

a first flat horizontal plate disposed above and spaced from the member and lying in a second horizontal plane, the first plate being movable along either or both X and Y axes lying in the second plane which are vertically aligned with the corresponding X and Y axes of the member, the first plate having an active circular area with a center;

a second flat horizontal plate disposed above and spaced from the first plate and lying in a third horizontal plane, the second plate being freely movable in a horizontal plane along either or both X and Y axes lying in the third plane which are vertically aligned with the corresponding X and Y axes of the member, the second plate having an active circular area with a center and being rotatable about a vertical axis, the Z axis, which extends through the centers of the first and second plates, the second plate having a home position at which the center of the second plate is vertically aligned with the center point and at which the angle of rotation is at 0 degrees; and

a vertical spindle defining the Z axis and interconnecting the centers of the first and second plates, the second plate being rotatable about the spindle, the first plate being non-rotatable about the spindle, so that movement of the second plate along either or both X and Y axes in the third plane produces corresponding movement of the first plate in the second plane but rotation of the second plate about the Z axis produces no rotation of the first plate.

**2**. The structure of claim **1** further including first means supporting the second plate above the member in such manner that the second plate can be moved and held in any planar position with respect to any one or more of the X and Y axes and in any position of rotation about the Z axis by an operator in an almost frictionless manner.

**3**. The structure of claim **2** further including second means connected to said second plate for automatically returning the second plate to home position as soon as the operator releases the second plate.

**4**. The structure of claim **3** further including third means coupled to the first plate and the member to produce a first signal which is monotonically related to any displacement of the center of the first plate from the center point of the member along the X axis.

**5**. The structure of claim **4** further including fourth means coupled to the first plate and the member to produce a second signal which is monotonically related to any displacement of the center of the first plate from the center point of the member along the Y axis.

**6**. The structure of claim **5** further including fifth means coupled to the second plate to produce a third signal which is monotonically related to any degree of angular rotation of the second plate about the Z axis as measured from the home position.

**7**. The structure of claim **6** further including sixth means responsive to the first signal to produce a fourth signal monotonically related to an acceleration value proportional to the amount of displacement along the X axis.

**8**. The structure of claim **7** further including seventh means responsive to the second signal to produce a fifth signal monotonically related to an acceleration value proportional to the amount of displacement along the Y axis.

**9**. The structure of claim **8** further including eighth means responsive to the third signal to produce a sixth

signal monotonically related to an acceleration value proportional to the amount of angular rotation about the Z axis.

**10**. The structure of claim **1** further including at least one tension network interconnecting the first plate and the member to restrict the motion of the first plate to movement in the second plane and prevent rotation of the first plate about the Z axis.

**11**. The structure of claim **10** further including second means coupled to both the first plate and the member to produce a first signal which is monotonically related to the displacement of the center of the first plate from the center point of the member along the X axis and a second signal which is monotonically related to the displacement of the center of the first plate from the center point of the member along the Y axis.

**12**. The structure of claim **10** further including second means coupled to both the first plate and the member to produce a first signals which is monotonically related to the displacement of the center of the first plate from the center point of the member along one of the X and Y axes.

* * * * *

# Exhibit 14

#14 Amdt
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P18446.A05

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



Applicants : M. KLEIN et al.



Group Art Unit: 2675

Examiner: J. Nguyen



Appln. No : 09/390,996

Filed : September 7, 1999

For : METHOD AND DEVICE FOR DETECTING SPECIFIC STATES OF MOVEMENT OF A USER

**AMENDMENT UNDER 37 C.F.R. 1.111**

Commissioner of Patents and Trademarks
Washington, DC 20231

Sir :

Responsive to the Official Action of October 13, 2000, reconsideration and withdrawal of the rejections made therein are respectfully requested, in view of the following amendments and remarks.

Inasmuch as the Official Action sets a three-month shortened statutory period which expires January 16, 2001 (January 13, 2001 being a Saturday and January 15, 2001 being a federal holiday), this Amendment is being timely filed and no extension of time is believed necessary. However, if an extension is deemed by the Patent and Trademark Office to be necessary, the same is hereby requested and the Patent and Trademark Office is hereby authorized to charge any necessary fees in connection therewith or any fees necessary to preserve the pendency of this application to deposit account No. 19-0089.

P18446.A05

IN THE SPECIFICATION:

Page 14, line 15, replace "system, which is not represented." with --system DP.--; and

Page 17, line 6, insert --H-- after "cyber-helmet".

IN THE CLAIMS:

Please amend the claims as follows (see appendix for changes to these claims):

1. (Twice Amended) A device for detecting certain states of movement of a body of a user and for generating signals corresponding to a result of a detection for subsequent processing in a data processing system, comprising:

a bearing device for supporting the body of the user;

said bearing device further comprising a support unit mounted in a tiltable manner on a base part;

said support unit comprising a standing part;

said standing part having a support surface for supporting the body of the user; and

a sensor device for detecting a direction and a magnitude of a position of a projection of the body's center of gravity into the support surface relative to a predetermined original position in the support surface,



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wherein the direction and the magnitude of the tilt of the support surface are detected for generating corresponding sensor signals,

wherein the support surface is mounted on the base part of said bearing device such that it can either rotate about an axis or move in a direction which is parallel to said axis,

said axis being one of:

vertically oriented when the support surface is oriented horizontally,

perpendicular to at least the support surface,

running through at least the base part and the support surface when the support surface is not tilted,

running through at least the support surface and a tiltable mounting, or

running through at least the base part and a tiltable mounting,

wherein the sensor device detects either the direction and the magnitude of a rotational movement of the body of the user about the axis or detects at least the magnitude of a vertical movement of the body's center of gravity, and generates corresponding sensor signals.

C1 Cancel.

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28. (Amended) A device for simulating an activity of a user, comprising:

C2 Cont.

a support part which is rotatable relative to a base structure, said support part comprising a support surface for at least partially supporting the user;



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a sensor device mounted to said base structure, said sensor device detecting movements of said support part;

an intermediate part disposed between said support part and said base structure; and

a joint connecting said support part to said sensor device, said joint defining an axis;

said axis being one of:

vertically oriented when the support surface is oriented horizontally,

perpendicular to at least the support surface,

running through at least the base structure and the support surface when the support surface is not tilted,

running through at least the support surface and said joint, or

running through at least the base structure and said joint,

wherein said support part is rotatable and tiltable about said axis when the user is disposed on said support surface.

66. (Amended) The device of claim 65, wherein said detent device includes a detent pin, a cooperating detent groove, and at least one stop device.

71. (Amended) A method of simulating an activity of a user, comprising:

at least partially supporting the user on a support surface of a support plate which is rotatable relative to a base structure about an axis;

said axis being one of:

vertically oriented when the support surface is oriented horizontally,

perpendicular to either the support surface or the base structure, or

running through at least the base structure and the support surface when the support surface is not tilted;

detecting movements of said support plate by way of a sensor device mounted to said base structure;

resisting rotational movement of said support plate relative to an intermediate plate by way of an adjustable rotation biasing device disposed between said support plate and said intermediate plate;

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resisting a tilting of said support plate by way of a detent device;

resisting tilting of said support plate by way of an adjustable tilt restoring device disposed between said base structure and said intermediate plate; and

placing the user on the support surface, wherein said support part is rotatable and tiltable about an axis when the user is placed on said support surface.

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[ Please add the following new claims:



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--72. A device for detecting certain states of movement of a body of a user and for generating signals corresponding to a result of a detection for subsequent processing in a data processing system, comprising:

a bearing device for supporting the body of the user;

said bearing device further comprising a support unit mounted in a tiltable manner on a base part;

said support unit comprising a standing part;

said standing part having a support surface for supporting the body of the user;

a sensor device for detecting a direction and a magnitude of a position of a projection of the body's center of gravity into the support surface relative to a predetermined original position of the support surface, said sensor device utilizing a point of intersection of an axis which runs through a tiltable mounting;

the direction and the magnitude of the tilt of the support surface being detected for generating corresponding sensor signals;

the support surface being mounted on the base part of said bearing device such that it can either rotate about said axis or move in a direction which is parallel to said axis;

the sensor device detecting either the direction and the magnitude of a rotational movement of the body of the user about the axis or detecting at least the magnitude of a vertical movement of the body's center of gravity, and generates corresponding sensor

signals,

wherein the support unit is connected to the base part such that it can tilt and rotate about said axis, the axis being a substantially vertical axis, the support unit being connected to the base part by a ball-and-socket joint, and

wherein the ball-and-socket joint is disposed on a tubular section which is telescopically guided with respect to a further tubular section, said further tubular section being secured to the base part.

73. The device of claim 72, wherein the sensor device is disposed at least partly in a holding space defined by the tubular section, the further tubular section and the base part.

74. The device of claim 73, wherein the sensor device is disposed in a protective housing, said sensor device including a stop that strikes against one of the tubular section and the further tubular section before the sensor device is deformed to excess.

75. A device for detecting certain states of movement of a body of a user and for generating signals corresponding to a result of a detection for subsequent processing in a data processing system, comprising:

a bearing device for supporting the body of the user;

said bearing device further comprising a support unit mounted in a tiltable manner on a base part;

said support unit comprising a standing part;

said standing part having a support surface for supporting the body of the user;

a sensor device for detecting a direction and a magnitude of a position of a projection of the body's center of gravity into the support surface relative to a predetermined original position of the support surface, said sensor device utilizing a point of intersection of an axis which runs through a tiltable mounting,

the direction and the magnitude of the tilt of the support surface being detected for generating corresponding sensor signals;

the support surface being mounted on the base part of said bearing device such that it can either rotate about said axis or move in a direction which is parallel to said axis;

the sensor device detecting either the direction and the magnitude of a rotational movement of the body of the user about the axis or detecting at least the magnitude of a vertical movement of the body's center of gravity, and generates corresponding sensor signals; and

a rotational restoring device for opposing a turning movement of the support surface,

wherein the rotational restoring device comprises at least one of elastic and spring-



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elastic element which is articulated at one end to the support part and at another end articulated to an intermediate part, and

wherein one of the articulation ends connects to a slide which can be displaced via a screw spindle.

76. A device for simulating an activity of a user, comprising:

a support part which is rotatable relative to a base structure, said support part comprising a support surface for at least partially supporting the user;

a sensor device mounted to said base structure, said sensor device detecting movements of said support part;

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an intermediate part disposed between said support part and said base structure;

a joint connecting said support part to said sensor device, said joint defining an axis;

said support part being rotatable and tiltable about said axis when the user is disposed on said support surface;

said sensor device further comprising a first section for connecting said joint to said base structure, said first section being moveable with respect to said base structure; and

a second section,

wherein said first section and said second section are telescopically disposed.



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77. A device for simulating an activity of a user, comprising:

a base structure;

a support part;

a tiltable joint connected to the support part and allowing the support part to tilt relative to the base structure;

an axis running through the tiltable joint;

the support part comprising a support surface which can move parallel to the axis, rotate about the axis, and tilt relative to the axis;

the support surface being adapted to at least partially support the user; and

a sensor device for detecting movement of the support surface,

wherein the support surface is movable parallel to the axis, and rotatable and tiltable about the axis, when the user is disposed on the support surface.--

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REMARKS

Claims 1-77 are pending, with claims 1, 28 and 70-77 being in independent form. Moreover, claims 15-20, 44 and 48-50 are withdrawn from consideration by the Examiner as being drawn to non-elected species.



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INTERVIEW OF 1-4-2001

Applicants appreciate the courtesy extended by the Examiner in the interview of January 4, 2001. In the interview, Applicants' representative discussed among other things, that none of the applied documents teach a device for detecting certain states of movement of a body of a user having a support surface which can either rotate about an axis running through a tiltable mounting or move parallel to the axis which runs through the tiltable mounting. Moreover, the Examiner agreed that if claims 1, 28 and 71 were amended to more clearly define the axis, that such amended claims would clearly define the invention over the applied documents. Accordingly, by this amendment, Applicants have amended independent claims 1, 28 and 71 to more clearly define the axis.

Accordingly, Applicants respectfully request that the Examiner reconsider the outstanding rejections in view of the above-noted claim amendments.

***Acknowledgment of Allowable Subject Matter***

Applicants acknowledge and appreciate the Examiner's indication that claim 70 is allowed. Moreover, Applicants also appreciate the Examiner's indication that claims 4-6, 11, 47 and 63 contain allowable subject matter and would be allowable if rewritten to include the limitations of the base claim and any intervening claims. Accordingly, new claims 72-74 substantially correspond to claims 4-6 but presented in independent form. Additionally, new

claims 75 and 76 substantially correspond to claims 11 and 47 but presented in independent form. However, Applicants are not presenting claim 63 in independent form at this time. Finally, the Examiner should note that new claim 77 does not correspond to any particular claim which was indicated to contain allowable subject matter. Nevertheless, Applicants believe that this claim is allowable over the applied documents of record, at least because it includes, among other things, a support surface which can move parallel to the axis, rotate about the axis, and tilt relative to the axis, such that the support surface is movable parallel to the axis, and rotatable and tiltable about the axis, when the user is disposed on the support surface.

RESTRICTION

Applicants submit that the election of species requirement is improper if amended claims 1 and 28 are found allowable. Applicants submit that should claims 1 and 28 be found allowable, then claims 15-20, 44 and 48-50 should also be indicated to be allowable since they would depend upon allowable claims. Accordingly, Applicants respectfully request that the Examiner withdraw the election of species requirement and respectfully request rejoinder of 15-20, 44 and 48-50 should claims 1 and 28 be found allowable.

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DRAWING OBJECTION

The drawings were objected to as failing to comply with 37 CFR 1.83(a). In this regard, the Examiner indicated that the helmet and data processor recited in the claims are not shown in the drawings. Reconsideration of this objection is respectfully requested.

By this Amendment, Applicants believe that this objection has been addressed. Specifically, the drawings and specification have been amended in the following manner:

With regard to the helmet, Fig. 1 has been amended to show the helmet (designated as "H") being connected to connection 80. Moreover, the specification on page 17, line 6, has been amended to indicate "H"; and

With regard to the data processor, Fig. 3 has been amended to show the data processor (designated as "D") being connected to signal line 38. Moreover, the specification on page 14, line 15, has been amended to indicate "D".

Accordingly, the Examiner is respectfully requested to withdraw this objection.

INDEFINITENESS REJECTION

Claim 66 was rejected under 35 U.S.C. 112, second paragraph, as being indefinite in regards to the "said device" limitation being unclear.

By this amendment, it is believed that this issue been addressed. Specifically, claim 66 has been amended to even more clearly recite that said device is the "detent device".

Accordingly, the rejection has been rendered moot and the Examiner is requested to withdraw the indefiniteness rejection.

ENABLEMENT REJECTION

Claims 65 and 66 were rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors had possession of the claimed invention.

Applicants respectfully traverse the above rejection. Claims 65 and 66 are completely supported by, e.g., Fig. 5. In particular, claim 65 recites a support part, e.g., standing plate 118, which further comprises at least one detent device, e.g., pin 192a, for resisting a tilting of said support part about said axis, e.g., the axis has been clearly recited in amended claim 28. Moreover, claim 66 recites the detent device includes a detent pin, e.g, 192a, a cooperating detent groove, e.g., 192b, and at least one stop device, e.g., 198. Furthermore, page 21 of the specification fully describes these features with reference to Fig. 5.

It is respectfully submitted that the disclosure, i.e., the specification and drawings, fully support the claimed subject matter in the above-noted claims. Applicants further submit that the specification and drawings describe the invention with respect to these claims in such detail as to enable a person skilled in the most relevant art to make and use it.

Thus, the above noted rejection is respectfully traversed for the reasons stated above. Accordingly, Applicants respectfully request that the rejection be withdrawn.

OBVIOUSNESS REJECTIONS

Claims 1, 2, 8-10, 12-14, 22, 25-31, 33-35, 37-39, 43, 45, 46, 55, 56, 64 and 71 were rejected as being unpatentable under 35 U.S.C. § 103(a), over MESKO et al. (US patent 5,409,226) alone.

Claims 3, 7, 40-42, 51-54 and 57-62 were rejected as being unpatentable under 35 U.S.C. § 103(a), over MESKO et al. (US patent 5,409,226) in view of WEISS (US patent 4,660,828).

Claims 21, 23, 32 and 36 were rejected as being unpatentable under 35 U.S.C. § 103(a), over MESKO et al. (US patent 5,409,226) in view of FURTADO et al. (US patent 5,049,079).

Claim 24 was rejected as being unpatentable under 35 U.S.C. § 103(a), over MESKO et al. (US patent 5,409,226) in view of WARD et al. (US patent 5,283,555).

Claims 67-69 were rejected as being unpatentable under 35 U.S.C. § 103(a), over MESKO et al. (US patent 5,409,226) in view of KALAWSKY (US patent 5,394,517).

Reconsideration of the above-noted rejections is requested. Notwithstanding, the office action assertions as to what the applied documents disclose or suggest, Applicants

have argued, and the Examiner has acknowledged in the interview of January 4, 2001, that MESKO et al. utilizes pivot 190a to control up and down movement of the support part 180 and that this pivot does not allow the support part 180 to move up and down "parallel to" the axis which runs from a base structure to a horizontal support surface. This movement of MESKO is acknowledged by the Examiner to be circular and/or a pivoting motion, rather than a straight up and down motion. Accordingly, the Examiner agreed that such a motion cannot properly be characterized as parallel to an axis which runs through the support surface.

Further, Applicants submit that MESKO et al. fails to disclose or suggest, inter alia, a support surface which is mounted on the base part of the bearing device such that it can either rotate about an axis or move in a direction which is parallel to the axis when the axis is defined as being one of; vertically oriented when the support surface is oriented horizontally, perpendicular to at least the support surface, running through at least the base part and the support surface when the support surface is not tilted, running through at least the support surface and a tiltable mounting, or running through at least the base part and a tiltable mounting as recited in amended claim 1, and inter alia, a joint connecting said support part to said sensor device, said joint defining an axis, wherein the axis is one of; vertically oriented when the support surface is oriented horizontally, perpendicular to at least the support surface, running through at least the base structure and the support surface when the

support surface is not tilted, running through at least the support surface and said joint, or running through at least the base structure and said joint, wherein said support part is rotatable and tiltable about said axis when the user is disposed on said support surface, as recited in amended claim 28, and inter alia, at least partially supporting the user on a support surface of a support plate which is rotatable relative to a base structure about an axis, wherein the axis is one of: vertically oriented when the support surface is oriented horizontally, perpendicular to either the support surface or the base structure, or running through at least the base structure and the support surface when the support surface is not tilted, detecting movements of said support plate by way of a sensor device mounted to said base structure, and resisting rotational movement of said support plate relative to an intermediate plate by way of an adjustable rotation biasing device disposed between said support plate and said intermediate plate, as recited inn claim 71.

Applicants further submit that each of WEISS, WARD et al., KALAWSKY, and FURTADO et al. similarly fail to disclose at least these features and that no proper combination of MESKO and one or more of these documents renders unpatentable at least the above-noted features of at least claims 1, 28 and 71.

In particular, it is clear from the figures in WEISS that support surface 3 does not move, much less, rotate, tilt, and/or move up and down, e.g., vertically. It is also clear from figures 5 and 6 of WARD et al. that support surface 26a is not tiltable, much less, tiltable

about an axis. Moreover, the support surface 26a is shown resting supports 28 so that there can be no up and down movement of the support surface, much less, movement parallel to an axis. Further, the Examiner applied FURTADO for its disclosure of a tilting support surface and its disclosure of a foot retaining loop. However, Applicants believe that this document lacks the claimed axis and at the very least an axis about which a support surface can rotate and/or tilt. Finally, KALAWSKY appears limited to connecting a helmet for projecting images to a user to a simulating unit. However, there is no disclosure to connecting the helmet to a device as defined in at least claims 1, 28 and 71.

Applicants further submit that none of the applied documents, alone or in combination, suggest any benefit to modifying their respective device so as to have a support surface which is mounted on the base part of the bearing device such that it can either rotate about an axis or move in a direction which is parallel to the axis when the axis is defined as being one of: vertically oriented when the support surface is oriented horizontally, perpendicular to at least the support surface, running through at least the base part and the support surface when the support surface is not tilted, running through at least the support surface and a tiltable mounting, or running through at least the base part and a tiltable mounting, as recited in amended claim 1, or a joint connecting said support part to said sensor device, said joint defining an axis, wherein the axis is one of: vertically oriented when the support surface is oriented horizontally, perpendicular to at least the support surface,

running through at least the base structure and the support surface when the support surface is not tilted, running through at least the support surface and said joint, or running through at least the base structure and said joint, wherein said support part is rotatable and tiltable about said axis when the user is disposed on said support surface, as recited in amended claim 28, or at least partially supporting the user on a support surface of a support plate which is rotatable relative to a base structure about an axis, wherein the axis is one of: vertically oriented when the support surface is oriented horizontally, perpendicular to either the support surface or the base structure, or running through at least the base structure and the support surface when the support surface is not tilted, detecting movements of said support plate by way of a sensor device mounted to said base structure, and resisting rotational movement of said support plate relative to an intermediate plate by way of an adjustable rotation biasing device disposed between said support plate and said intermediate plate, as recited inn claim 71, so as to provide a requisite motivation for combining these documents. Accordingly, because none of the applied documents disclose or suggest any benefit to utilizing these features, Applicants submit that there is no motivation to modify the documents in the manner suggested by the Examiner.

Because none of the above-noted documents alone or in combination disclose or suggest, inter alia, a support surface which is mounted on the base part of the bearing device such that it can either rotate about an axis or move in a direction which is parallel to the axis

when the axis is defined as being one of: vertically oriented when the support surface is oriented horizontally, perpendicular to at least the support surface, running through at least the base part and the support surface when the support surface is not tilted, running through at least the support surface and a tiltable mounting, or running through at least the base part and a tiltable mounting as recited in amended claim 1, and inter alia, a joint connecting said support part to said sensor device, said joint defining an axis, wherein the axis is one of: vertically oriented when the support surface is oriented horizontally, perpendicular to at least the support surface, running through at least the base structure and the support surface when the support surface is not tilted, running through at least the support surface and said joint, or running through at least the base structure and said joint, wherein said support part is rotatable and tiltable about said axis when the user is disposed on said support surface, as recited in amended claim 28, and inter alia, at least partially supporting the user on a support surface of a support plate which is rotatable relative to a base structure about an axis, wherein the axis is one of: vertically oriented when the support surface is oriented horizontally, perpendicular to either the support surface or the base structure, or running through at least the base structure and the support surface when the support surface is not tilted, detecting movements of said support plate by way of a sensor device mounted to said base structure, and resisting rotational movement of said support plate relative to an intermediate plate by way of an adjustable rotation biasing device disposed between said support plate and said

intermediate plate, as recited inn claim 71, Applicants further submit that no proper combination of these documents can render unpatentable the combination of features recited in at least independent claims 1, 28 and 71. Thus, no proper combination of these documents can render unpatentable the combination of features recited in at least independent claims 1, 28 and 71.

Thus, Applicants submit that there is no motivation or rationale disclosed or suggested in the art to combine the references in the manner asserted by the Examiner. Nor does the Examiner's opinion provide a proper basis for these features or for the motivation to modify any of these documents, or their combination, in the manner suggested by the Examiner. Therefore, Applicants submit that the invention as recited in at least independent claims 1, 28 and 71 is not rendered obvious by any reasonable inspection of these disclosures.

Additionally, Applicants submit that claims 2-27 and 29-69 are allowable at least for the reason that these claims depend from allowable base claims and because these claims recite additional features that further define the present invention. In particular, Applicants submit that no proper reading of any of the applied documents, or their combination, renders obvious, in combination: that the support unit further comprises an intermediate part disposed between the support part and the base part, wherein the intermediate part is connected to the support part such that the intermediate part tilts with the support part and

such that the support part rotates relative to the intermediate part, and wherein the intermediate part is connected to the base part in a rotationally rigid manner as recited in claim 2; that the support unit is connected to the base part such that it can tilt and rotate about said axis, the axis being a substantially vertical axis, the support unit being connected to the base part by a ball-and-socket joint as recited in claim 3; that the ball-and-socket joint is disposed on a tubular section which is telescopically guided with respect to a further tubular section, said further tubular section being secured to the base part as recited in claim 4; that the sensor device is disposed at least partly in a holding space defined by the tubular section, the further tubular section and the base part as recited in claim 5; that the sensor device is disposed in a protective housing, said sensor device including a stop that strikes against one of the tubular section and the further tubular section before the sensor device is deformed to excess as recited in claim 6; that the sensor device comprises a first part and a second part, the first part being secured to the base part and the second part being connected to the ball-and-socket joint which is fixed to the support unit so as to tilt and rotate with it, and wherein the ball-and-socket joint is moveable relative to the second part as recited in claim 7; that the device further comprises a tilt restoring device for opposing a tilting of the support surface as recited in claim 8; that the tilt restoring device comprises at least one compressible element, the at least one compressible element being filled with a compressible medium as recited in claim 9; that the device further comprises a rotational restoring device for opposing

a turning movement of the support surface as recited in claim 10; that the rotational restoring device comprises at least one of elastic and spring-elastic element which is articulated at one end to the support part and at another end articulated to an intermediate part, wherein one of the articulation ends connects to a slide which can be displaced via a screw spindle as recited in claim 11; that the device further comprises a restoring device for opposing a vertical movement of the support surface as recited in claim 12; that the vertical restoring device comprises at least one compressible element, the at least one element being filled with a compressible medium as recited in claim 13; that the restoring device is variable as recited in claim 14; that the device further comprises a tilt detent device for allowing the support surface to tilt from of an initial position when a tilting moment is exerted which exceeds a predetermined tilting moment being exerted on the support surface as recited in claim 15; that the device further comprises a rotational detent device for allowing the support surface to turn when a torque is exerted which exceeds a predetermined torque being exerted on the support surface as recited in claim 16; that the device further comprises a vertical detent device for allowing the support surface to move vertically when an impulse is exerted which exceeds a predetermined impulse being exerted on the support surface as recited in claim 17; that the detent device comprises a detent pin connected to one of the support unit and the base part, wherein the bearing device further comprises a detent depression and wherein the detent pin is preloaded by a spring into the detent depression as recited in claim 18; that the

detent device comprises at least three detent pins which each co-operate with a corresponding detent depression wherein each depression extends in a substantially vertical direction over a predetermined length as recited in claim 19; that the device further comprises one of a tilt limiting device, a rotational angle limiting device and a vertical movement limiting device as recited in claim 20; that the bearing device is variably moveable from an initial position relative to a foundation as recited in claim 21; that the support surface comprises a non-slip surface coating as recited in claim 22; that the device further comprises at least one retaining loop or tie for retaining a foot of the user on the support surface as recited in claim 23; that the sensor device comprises an optoelectronic sensor device as recited in claim 24; that the device further comprises at least one connection for connecting a further device for detecting movements of the user as recited in claim 25; that the device further comprises at least one connection for connecting one of a visual and acoustic output unit as recited in claim 26; that the at least one connection comprises a standardized interface for a data processing system, the standardized interface being one of a serial or parallel interface as recited in claim 27; that said movements are communicated to the user in the form of visual images as recited in claim 29; that said support part is rotatable relative to said intermediate part as recited in claim 30; that the device further comprises a restoring device for supporting said intermediate part as recited in claim 31; that said base structure is tiltable relative to a horizontal axis as recited in claim 32; that the device further comprises a biasing device for biasing said support

part against rotational movement relative to said intermediate part as recited in claim 33; that said biasing device comprises an adjusting mechanism as recited in claim 34; that the device further comprises a bearing disposed between said support part and said intermediate part as recited in claim 35; that said support surface comprises at least one foot retention element as recited in claim 36; that said support surface comprises a non-slip coating as recited in claim 37; that the device further comprises at least one connection for allowing said sensor device to communicate said movements as recited in claim 38; that said connection comprises one of a parallel or serial connection as recited in claim 39; that said joint comprises a ball joint which allows the support to pivot in a number of directions as recited in claim 40; that said ball joint further comprises a connecting element which connects said support device to said sensor device as recited in claim 41; that the device further comprises a bearing disposed between said connecting element and said intermediate part for allowing said connecting element to rotate relative to said intermediate part as recited in claim 42; that said sensor device further comprises a sensor for detecting a number of movements of said joint as recited in claim 43; that said sensor device further comprises a detent pin extending from said joint, said sensor detecting a number of movements of said detent pin as recited in claim 44; that said sensor device further comprises a first section for connecting said joint to said base structure as recited in claim 45; that said first section is moveable with respect to said base structure as recited in claim 46; that the device further comprises a second

section, and wherein said first section and said second section are telescopically disposed as recited in claim 47; that the device further comprising a biasing device for biasing said joint to an initial non-tilting position as recited in claim 48; that said biasing device biases a detent pin extending from said joint toward said axis as recited in claim 49; that the device further comprises a joint detent device for biasing said joint to an initial non-rotation position as recited in claim 50; that said joint comprises a ball joint, said ball joint further comprising a ball, a ball shell, and a pin as recited in claim 51; that said ball shell comprises at least two parts which connect said ball to a first section, and wherein said pin is pivotable with respect to said ball as recited in claim 52; that said pin connects said support part to said sensor device as recited in claim 53; that said pin connects said intermediate part to said sensor device as recited in claim 54; that said sensor device further comprises a stationary plate and a mobile plate and a device for biasing said mobile plate away from said stationary plate as recited in claim 55; that said joint is connected to said mobile plate as recited in claim 56; that said joint comprises a ball joint, said ball joint further comprising a ball, a ball shell, and a pin as recited in claim 57; that said ball shell comprises at least two parts which connect said ball to a first section, and wherein said pin is pivotable with respect to said ball as recited in claim 58; that said pin connects said support part to said sensor device as recited in claim 59; that said pin connects said intermediate device to said sensor device as recited in claim 60; that the device further comprises an elastic element disposed between said pin

and said mobile plate as recited in claim 61; that the device further comprises a first section for connecting said joint to said base structure, said first section being moveable with respect to said base structure as recited in claim 62; that the device further comprises a second section, and wherein said first section and said second section are telescopically disposed as recited in claim 63; that said support part further comprises at least one stop element and wherein said intermediate part further comprises at least one mating stop element, said at least one stop element cooperating with said at least one mating stop element as recited in claim 64; that the support part further comprises at least one detent device for resisting a tilting of said support part about said axis as recited in claim 65; that said device includes a detent pin, a cooperating detent groove, and at least one stop device as recited in claim 66; that the device further comprises a helmet for projecting images to a user, a data processor for receiving input signals from said sensor device, wherein said sensor device detects movement of said user based upon movement of said support part and generates signals, said signals being manipulated by said data processor, such that the images are altered based upon movement of said support part as recited in claim 67; that said support device is moveable in a direction parallel to said axis with respect to said base structure as recited in claim 68; and that the device further comprises an adjustable tilt restoring device which resists the tilting of said support part as recited in claim 69.

Finally, all the above noted obviousness rejections are respectfully traversed for the

reasons stated above. Furthermore, Applicants note that it is improper to simply pick and choose limitations recited as part of Applicants' invention found in various documents and assert that it would have been obvious to combine the teachings of these documents without the requisite motivation or rationale for combining under 35 U.S.C. § 103(a).

Accordingly, Applicants respectfully request reconsideration and withdrawal of all the obviousness rejections and further requests that the above note claims be indicated as allowable.

REJOINDER OF NON-ELECTED CLAIMS

Applicants submit that if amended claims 1 and 28 are found allowable, then claims 15-20, 44 and 48-50 should also be indicated to be allowable since they would depend upon allowable claims. Accordingly, Applicants respectfully request rejoinder of 15-20, 44 and 48-50 should claims 1 and 28 be found allowable.

NEW CLAIMS

Applicants submit that the newly presented claims 72-77 are allowable over the applied art of record. In particular:

independent claim 72 substantially corresponds to claim 4 presented in independent form and which was indicated to contain allowable subject matter;

dependent claims 73 and 74 depend from claim 72 which is believed to be allowable;

independent claim 75 substantially corresponds to claim 11 presented in independent form and which was indicated to contain allowable subject matter;

independent claim 76 substantially corresponds to claim 47 presented in independent form and which was indicated to contain allowable subject matter; and

independent claim 77 is believed allowable over the applied documents of record, at least because it includes, among other things, a support surface which can move parallel to the axis, rotate about the axis, and tilt relative to the axis, such that the support surface is movable parallel to the axis, and rotatable and tiltable about the axis, when the user is disposed on the support surface.

Accordingly, Applicants respectfully request allowance of the above noted new claims.

REASONS FOR ALLOWANCE

In response to the Statement of Reasons for Allowance set forth in the Office Action, Applicant wishes to clarify the record with respect to the basis for the patentability of claim 70 in the present application. In this regard, while Applicant does not disagree with the Examiner's indication that certain identified features are not disclosed by the references,

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Applicant submits that claim 70 in the present application recites a combination of features, and that the basis for patentability of this claim is based on the totality of the recited features.

## CONCLUSION

In view of the foregoing, it is submitted that the claims have been amended to eliminate any arguable basis for rejection under 35 U.S.C. § 112. The applied references of record have been discussed and distinguished, while significant claimed features of the present invention have been pointed out.

Further, any amendments to the claims which have been made in this response and which have not been specifically noted to overcome a rejection based upon the prior art, should be considered to have been made for a purpose unrelated to patentability, and no estoppel should be deemed to attach thereto.

Accordingly, reconsideration of the outstanding Office Action and allowance of the present application and all the claims therein are respectfully requested and now believed to be appropriate.

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Please charge any additional fees necessary for consideration of the papers filed herein and refund excess payments to Deposit Account No. 19-0089.

Respectfully submitted,
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Attachment: APPENDIX

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APPENDIX

1. (Twice Amended) A device for detecting certain states of movement of a body of a user and for generating signals corresponding to a result of a detection for subsequent processing in a data processing system, comprising:

a bearing device for supporting the body of the user;

said bearing device further comprising a support unit mounted in a tiltable manner on a base part;

said support unit comprising a standing part;

said standing part having a support surface for supporting the body of the user; and

a sensor device for detecting a direction and a magnitude of a position of a projection of the body's center of gravity into the support surface relative to a predetermined original position [of] in the support surface, [said sensor device utilizing a point of intersection of an axis which runs through a tiltable mounting]

wherein the direction and the magnitude of the tilt of the support surface are detected for generating corresponding sensor signals,

wherein the support surface is mounted on the base part of said bearing device such that it can either rotate about [said] an axis or move in a direction which is parallel to said axis,

said axis being one of:

vertically oriented when the support surface is oriented horizontally,

perpendicular to at least the support surface,

running through at least the base part and the support surface when the support surface is not tilted,

running through at least the support surface and a tiltable mounting, or

running through at least the base part and a tiltable mounting,

wherein the sensor device detects either the direction and the magnitude of a rotational movement of the body of the user about the axis or detects at least the magnitude of a vertical movement of the body's center of gravity, and generates corresponding sensor signals.

28. (Amended) A device for simulating an activity of a user, comprising:

a support part which is rotatable relative to a base structure, said support part comprising a support surface for at least partially supporting the user;

a sensor device mounted to said base structure, said sensor device detecting movements of said support part;

an intermediate part disposed between said support part and said base structure; and

a joint connecting said support part to said sensor device, said joint defining an axis;

said axis being one of:

vertically oriented when the support surface is oriented horizontally,

perpendicular to at least the support surface,

running through at least the base structure and the support surface when the support surface is not tilted,

running through at least the support surface and said joint, or

running through at least the base structure and said joint,

wherein said support part is rotatable and tiltable about said axis when the user is disposed on said support surface.

66. (Amended) The device of claim 65, wherein said detent device includes a detent pin, a cooperating detent groove, and at least one stop device.

71. (Amended) A method of simulating an activity of a user, comprising:

at least partially supporting the user on a support surface of a support plate which is rotatable relative to a base structure about an axis;

said axis being one of:

vertically oriented when the support surface is oriented horizontally,

perpendicular to either the support surface or the base structure, or

running through at least the base structure and the support surface when the support surface is not tilted;

detecting movements of said support plate by way of a sensor device mounted to

said base structure;

resisting rotational movement of said support plate relative to an intermediate plate by way of an adjustable rotation biasing device disposed between said support plate and said intermediate plate;

resisting a tilting of said support plate by way of a detent device;

resisting tilting of said support plate by way of an adjustable tilt restoring device disposed between said base structure and said intermediate plate; and

placing the user on the support surface, wherein said support part is rotatable and tiltable about an axis when the user is placed on said support surface.

# Exhibit 15

US005860861A

# United States Patent [19]

Lipps et al.

[11] Patent Number: 5,860,861

[45] Date of Patent: Jan. 19, 1999

[54] **RIDING BOARD GAME CONTROLLER**

[75] Inventors: **John D. Lipps**, 2075 Case Pkwy. South, Twinsburg, Ohio 44087; **Stephen J. Szczecinski**, Stow; **Gregory J. Svetina**, Streetsboro, both of Ohio

[73] Assignee: **John D. Lipps**, Kent, Ohio

[21] Appl. No.: **799,453**

[22] Filed: **Feb. 13, 1997**

**Related U.S. Application Data**

[63] Continuation-in-part of Ser. No. 436,983, May 8, 1995, abandoned.

[51] **Int. Cl.**[6] ..... **A63F 9/22**

[52] **U.S. Cl.** ..... **463/36**; 273/148 B

[58] **Field of Search** ..... 463/36, 37, 38, 463/39; 273/148 B; 434/253, 247; 482/902, 901, 1, 71, 70

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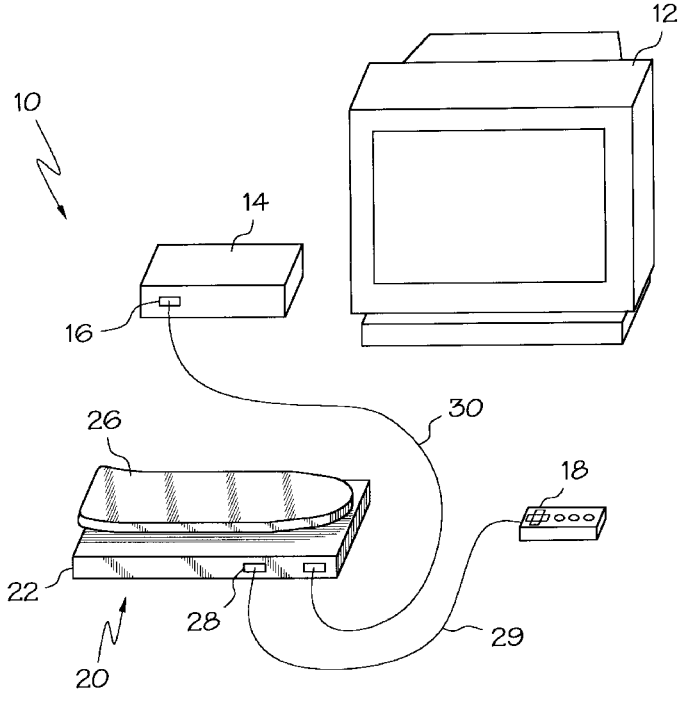
*Primary Examiner*—Michael O'Neill

*Attorney, Agent, or Firm*—Thompson Hine & Flory LLP

[57] **ABSTRACT**

A riding board game controller for sending directional and non-directional control signals to an audio-visual game having a microprocessor-based host computer for sending audio-visual signals to a display device, the riding board game controller comprising: a substantially rectangular platform, pivotally supported along its central longitudinal axis on a playing surface and adapted to support an operator standing thereon, such that side-to-side pivoting of the platform can be performed by the operator; a biasing system, positioned between the platform and the playing surface, for biasing the platform away from the playing surface; a left dual-state switch, positioned between the platform and the playing surface, on the left side of the longitudinal axis, and activated by a pivoting of the platform to the left side; a right dual-state switch, positioned between the platform and the playing surface, on the right side of the longitudinal axis, and activated by a pivoting of the platform to the right side; a center dual-state switch, positioned between the platform and the playing surface, substantially along or near the longitudinal axis, and activated by a movement of the longitudinal axis towards or away from the playing surface; and a signal processor for converting signals from the left and right switches into directional control signals, for converting a signal from the center switch into a non-directional signal, and for sending the directional and non-directional control signals to the host computer.

**12 Claims, 9 Drawing Sheets**



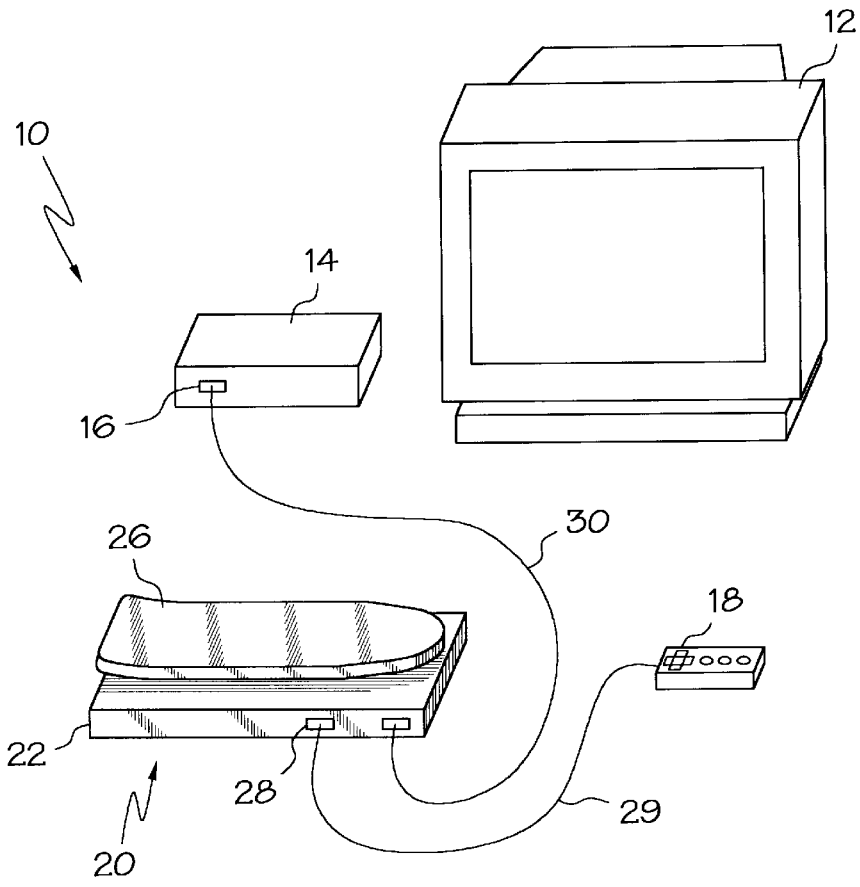

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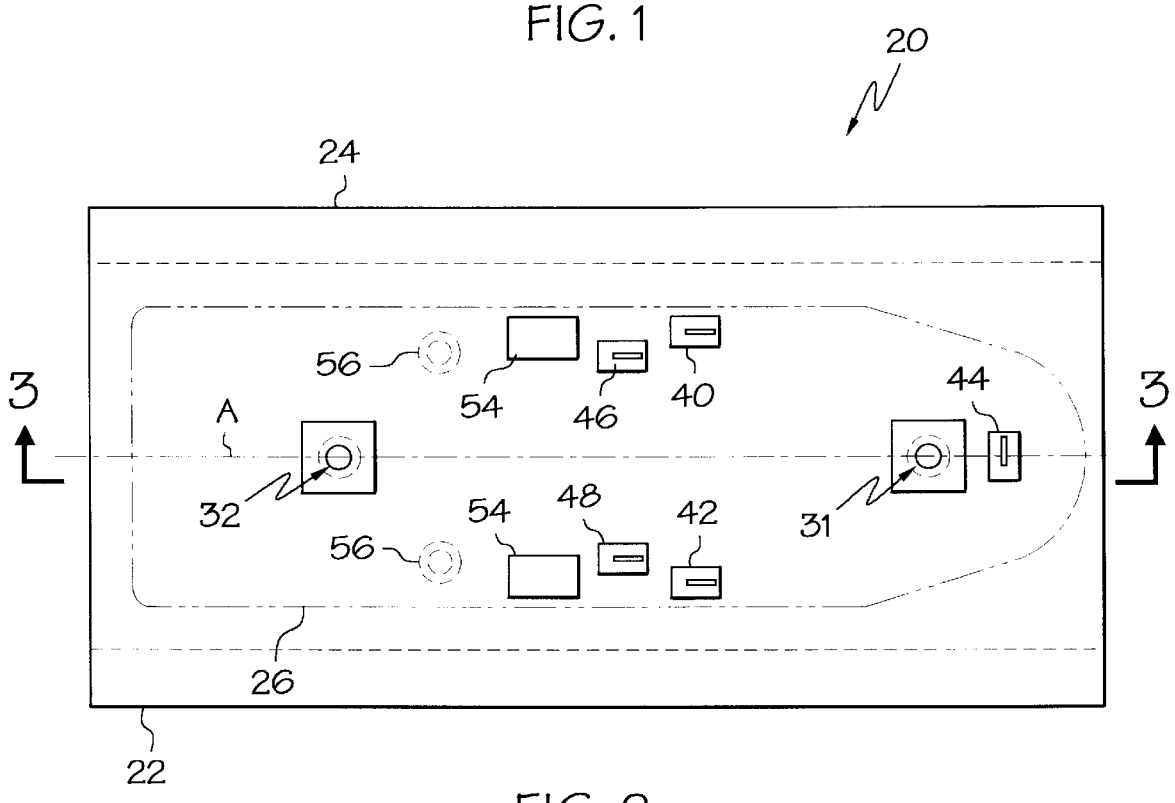
FIG. 1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26
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FIG. 2

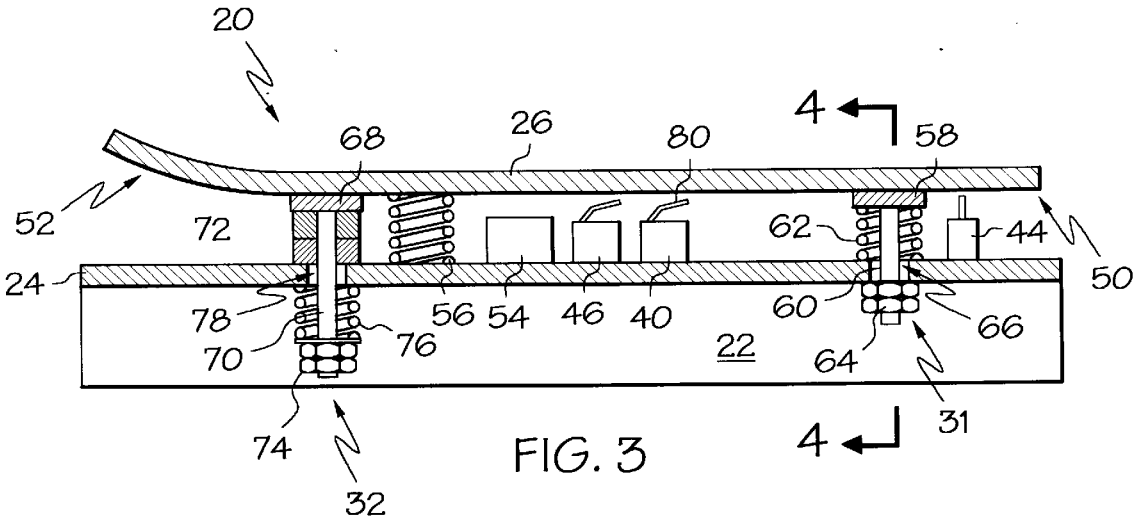



FIG. 3

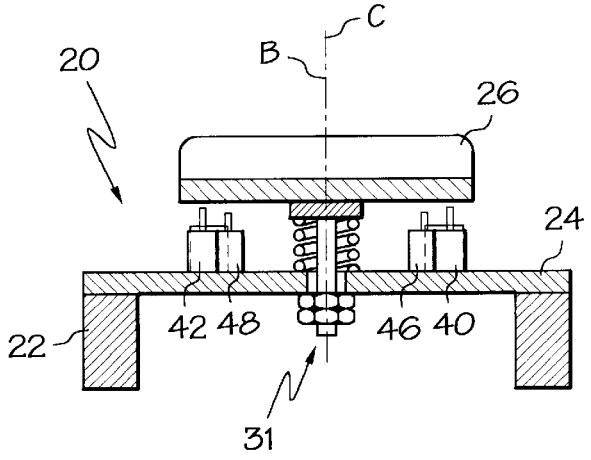



FIG. 4

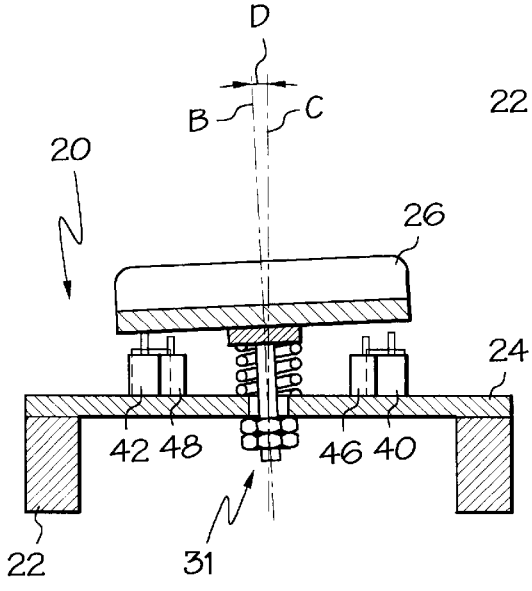



FIG. 5

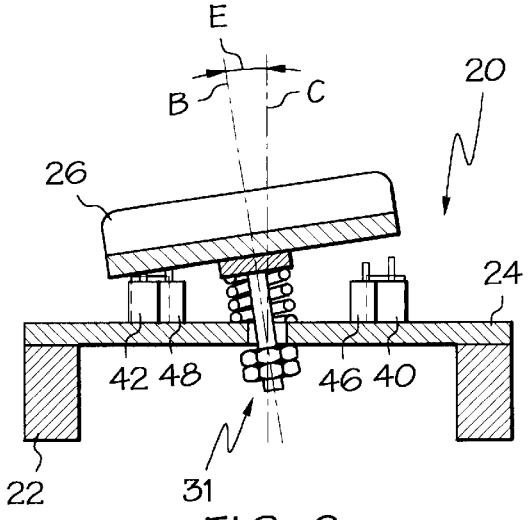



FIG. 6

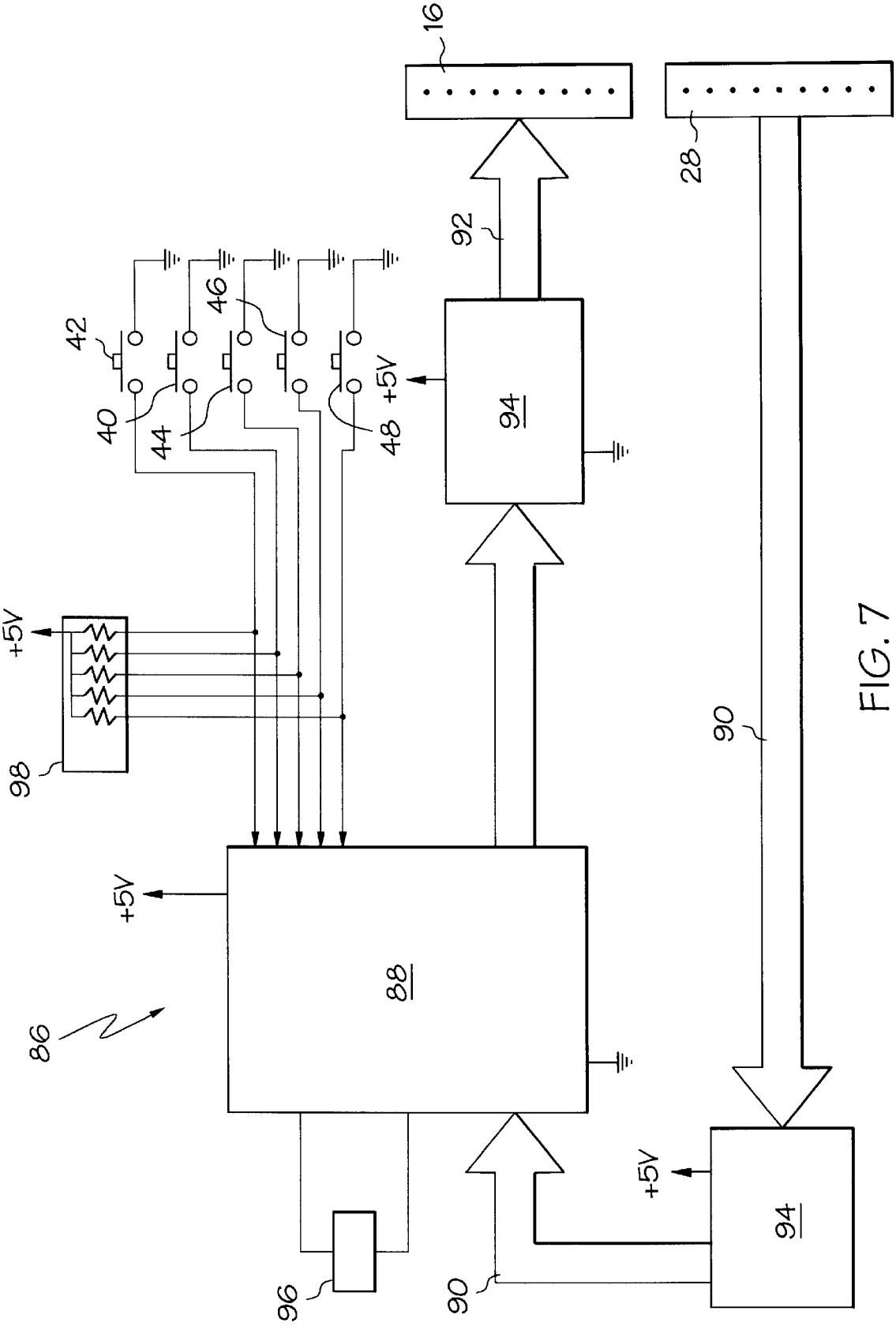



FIG. 7

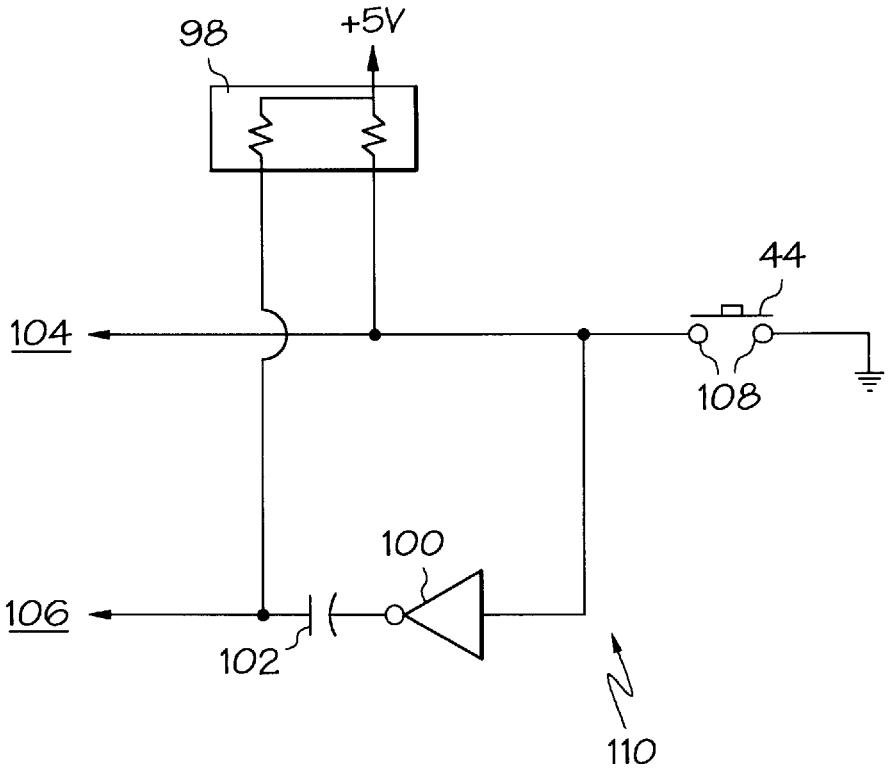
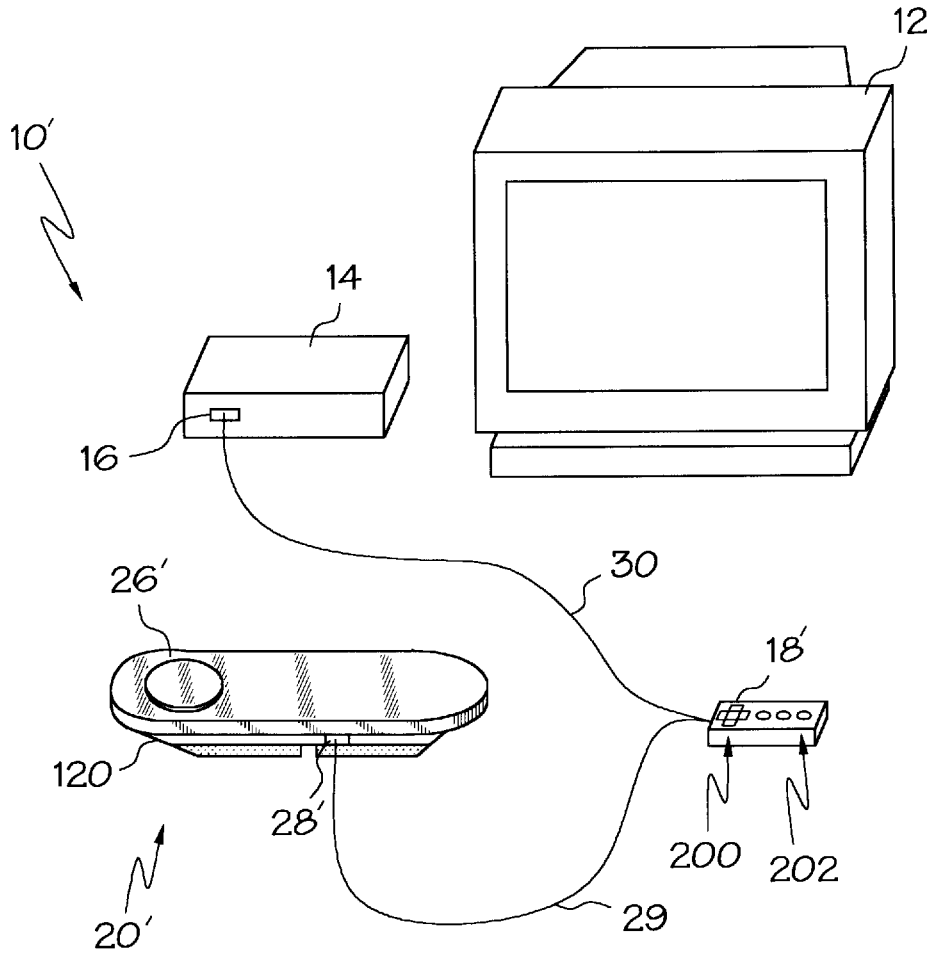



FIG. 8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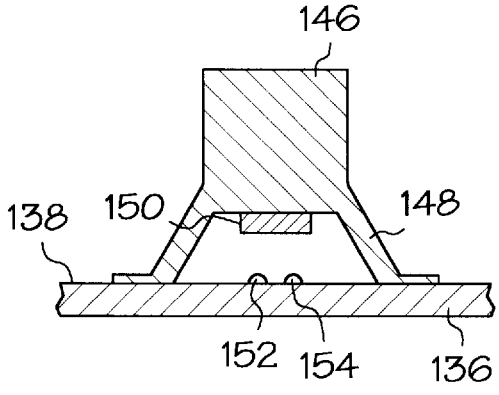
202
20'
29

FIG. 9


146
138
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152
154
136

FIG. 13

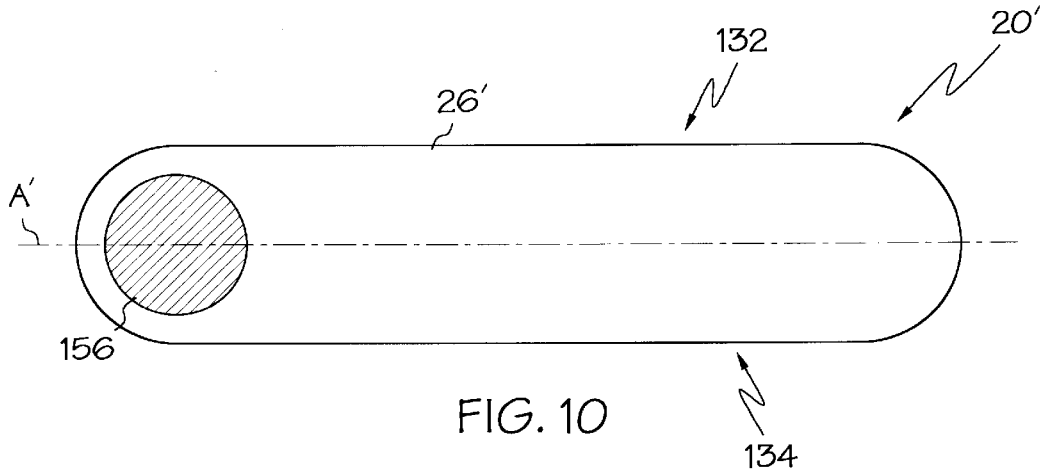


FIG. 10

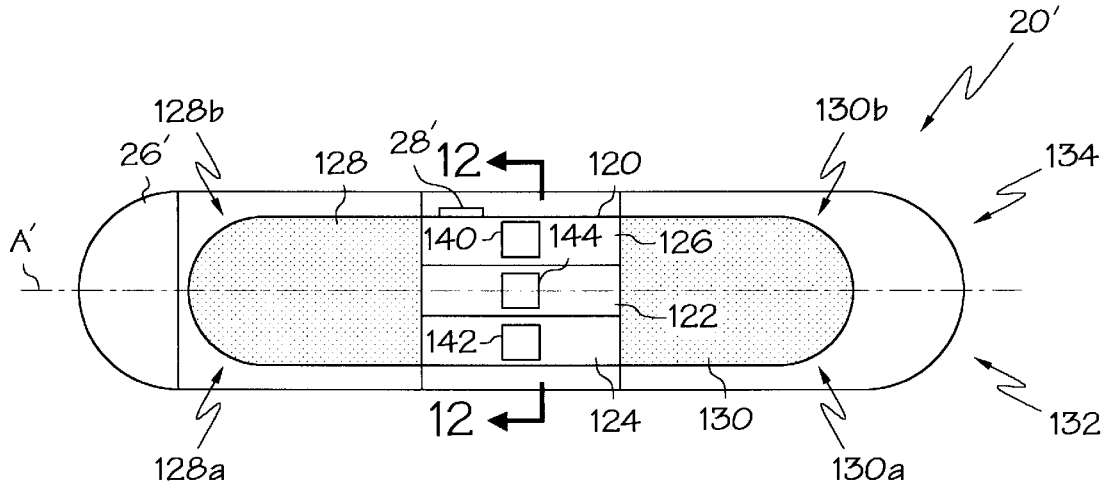


FIG. 11

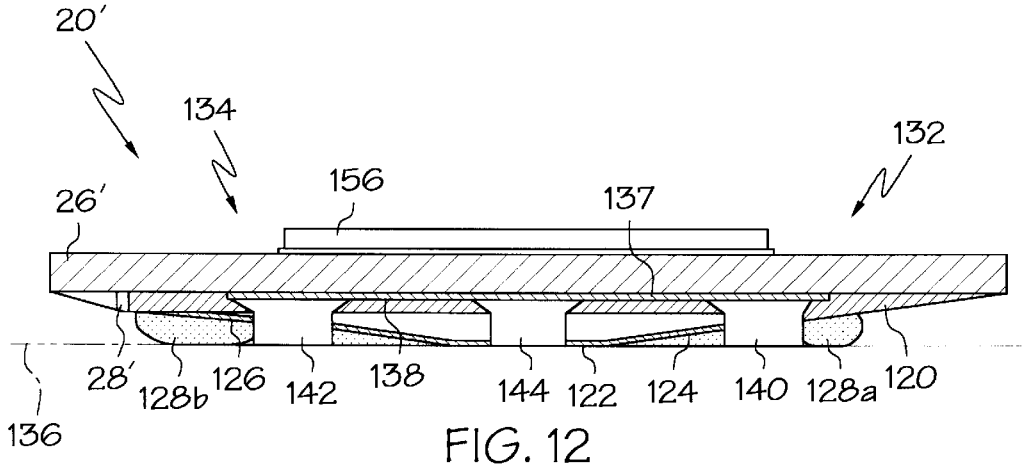


FIG. 12

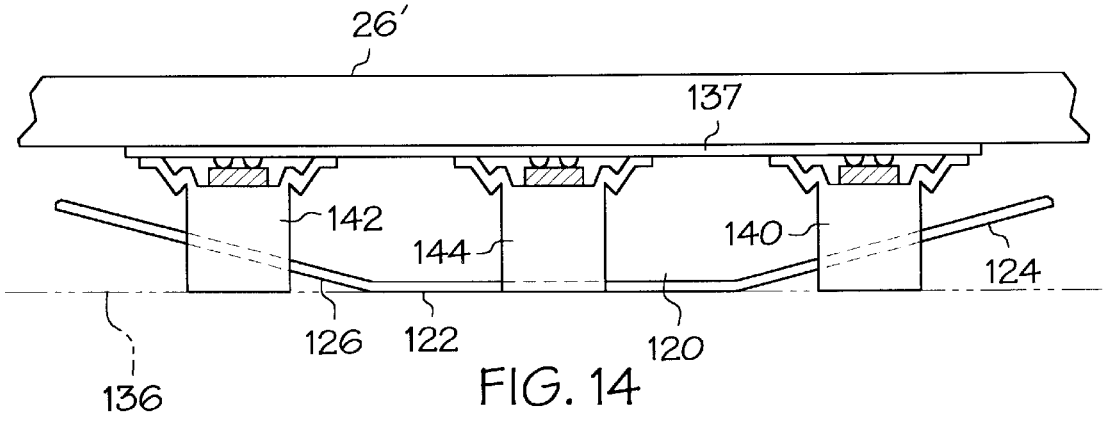


FIG. 14

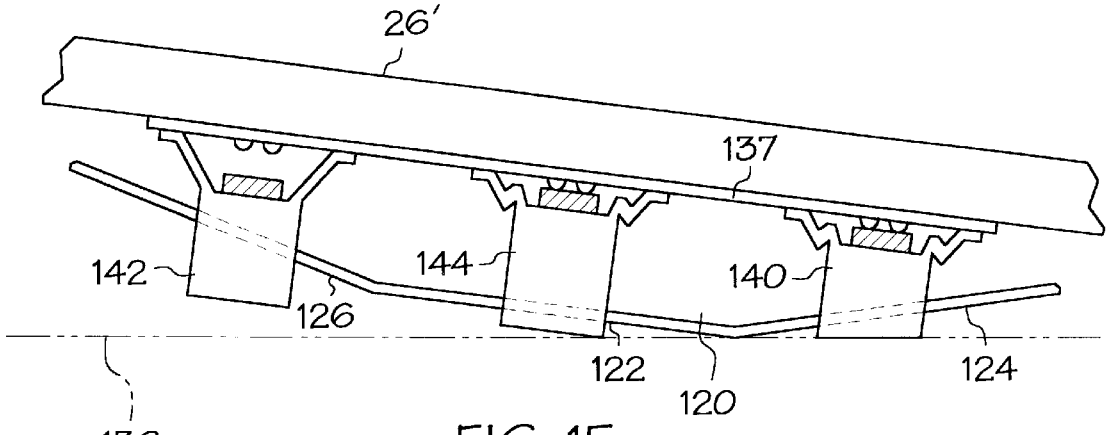


FIG. 15

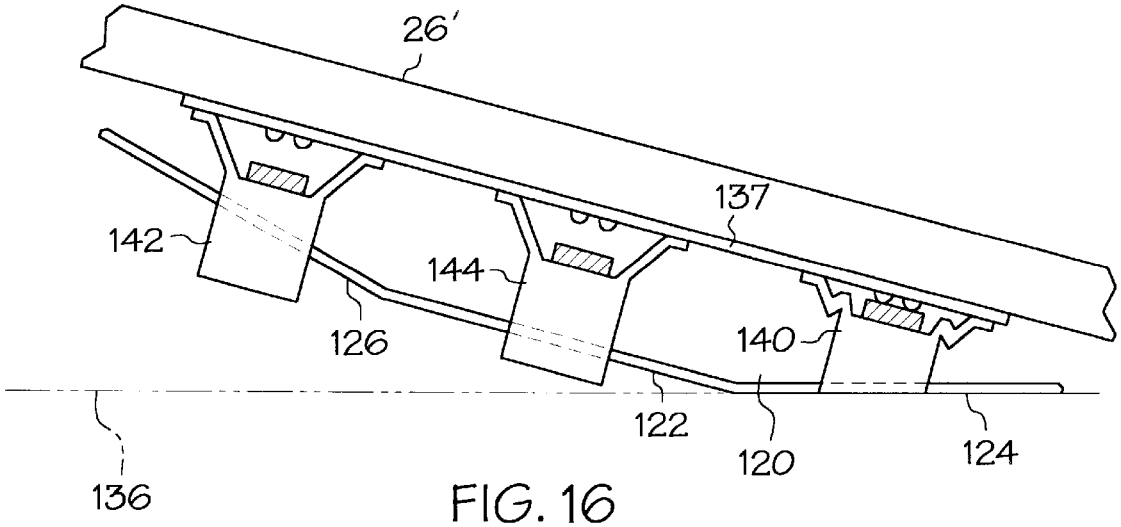


FIG. 16

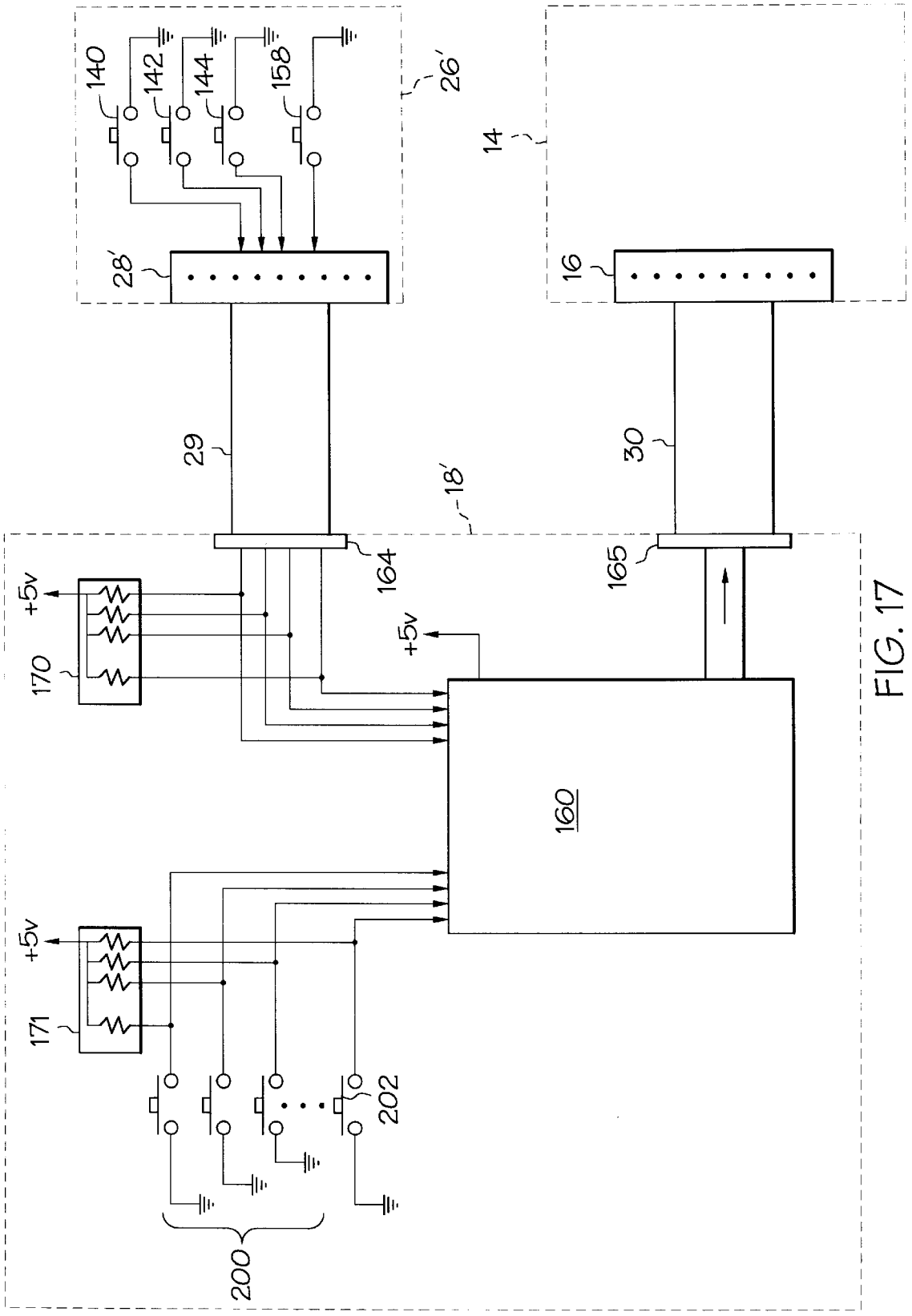
140
142
144
158
26'
14
28'
16
29
30
18'
164
165
+5v
170
+5v
160
+5v
171
202
200

FIG. 17

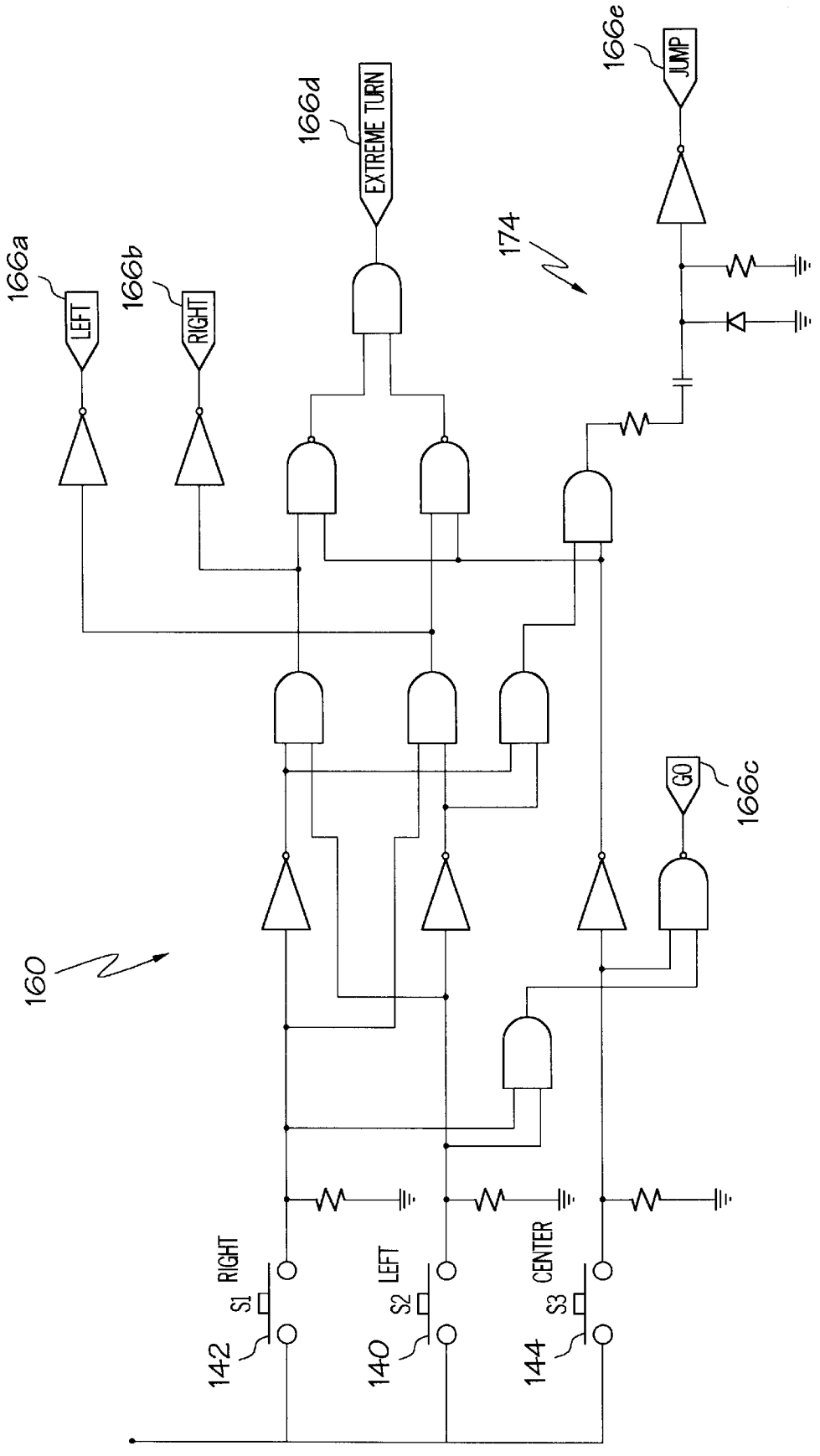
166a
LEFT
166b
RIGHT
166d
EXTREME TURN
166e
JUMP
174
160
GO
166c
RIGHT
S1
142
LEFT
S2
140
CENTER
S3
144

FIG. 18

# RIDING BOARD GAME CONTROLLER

## CROSS REFERENCE TO RELATED APPLICATIONS

The application is a continuation-in-part of U.S. application, Ser. No. 08/436,983, filed May 8, 1995 now abandoned.

## BACKGROUND

The present invention relates to computer peripheral devices and, more particularly, to controllers for computers, games and computer game devices.

Typical computer games and video games generally include an audio-visual display device (e.g., a television monitor), a computer host or video game unit which transmits the simulation video and audio signals to the display device, a port for receiving a video game software or data, and at least one hand manipulated control device with which the game operator interacts with the video game. Such hand manipulated control devices exist in many forms such as a hand-held control pad, a keyboard, a joystick, a mouse, a trackball, and the like. Typically, hand manipulated control devices have directional controls for moving a character in the game and auxiliary controls for other activities such as causing the character to perform a certain act, such as jumping.

One type of hand-held control pad, for example, has four directional control push-buttons and a number of non-directional push-buttons. The push-buttons are dual state (on/off) buttons. Each directional button, when pressed by the operator, causes a corresponding directional action of the character in the video game such as turning the character to the right or left. Auxiliary push buttons, when pressed, cause non-directional actions such as jumping, punching, ducking, shooting, etc. oftentimes, a directional, and an auxiliary push-button can be used in combination to effect a certain action in a certain direction, such as causing the image to punch right or left, or moving the image to the right or left with greater speed.

Many computer games and video games are based on the theme of skate boarding, snow boarding, or surfing. Generally, these games require the player to control the riding board action through such hand-manipulated controls. The game would be more enjoyable and the simulation more realistic if the hand-manipulated control device could be replaced by a control device that requires the actual body movement and coordination of an operator riding a skate board, a snow board, or a surf board.

U.S. Pat. No. 4,817,950 to Goo discloses a video game having a control unit in which the operator simulates riding a surf board. The game control unit of Goo is a surf board which is supported by a hemispherical fulcrum member and an inflatable annular tube which encircles the fulcrum for biasing the surf board to a substantially horizontal position over the fulcrum. The fulcrum encloses a gravity switch which makes electrical contact when the player pivots the surf board, and fulcrum, in certain directions. Consequently, while Goo discloses a video game control unit for simulating a surf board, the control unit has several disadvantages. The control unit is bulky and cannot be configured to substitute as a conventional hand-held control pad or keyboard. Further, the device provides directional signals only and thus is unable to send non-directional signals to the video game computer; and is unable to detect the magnitude of a directional pivot of the surf board, which would signal the image to execute a regular turn versus a sharp turn.



U.S. Pat. No. 4,906,192 to Smithard et al. discloses a skiing or snow-surfing simulator device. The device includes a control unit, which the player stands upon, a data processing means, and a visual display unit. In one embodiment of the control unit for the device (see FIG. **10**), a pair of skis are coupled above a base unit with springs or compliant pads such that they pivot or move thereover. Analog linear movement sensors are mounted to the base, between the skis and the base, to detect movement by the skis and to produce signals indicative thereof. The signals are processed by the data processing means and transmitted to the visual display unit to display a simulated trajectory or track that is visible to the person standing on (playing) the control unit. A disadvantage of the Smithard et al. controller is that it requires complicated analog sensors and data processing means to process the analog signals generated by the sensors. Furthermore, the Smithard et al. controller is not adapted to replace a hand-manipulated controller required by conventional video-game devices; and thus, does not disclose any solution for inexpensively and easily converting movement of the player into directional and non-directional signals required by such video-game devices.

Finally, neither Goo nor Smithard et al. provide for connection of one of the hand-manipulated controllers thereto; and therefore, are not equipped to allow for additional features of play provided by an additional hand-manipulated controller.

## SUMMARY OF THE INVENTION

The present invention is a riding board game controller for controlling a computer game or a conventional video-game device. The invention is configured to substitute a conventional hand-manipulated control device with riding board, which is stood upon by a player and pivots in response to a player's weight shift and generates signals to the game computer to cause the computer game image to execute normal left and right turns, sharp left and right turns, as well as speeding up and jump commands. In a preferred embodiment, the controller includes a port for connecting from a conventional hand-manipulated controller thereto, to allow the hand-manipulated controller to be manipulated to send commands to the computer, such as starting the game, scrolling menus and the like.

In accordance with the present invention a riding board game controller is provided for use with an audio-visual game having an audio-visual display device such as a television monitor, a host computer having a transmitter for sending audio-visual display signals to the display device, a receptacle for receiving control signals from a game controller, and a software program running on the computer and generating audio-visual signals in response to the control signals.

The riding board controller comprises: a substantially rectangular platform pivotally supported along its longitudinal axis upon a playing surface and adapted to support an operator standing thereon; a biasing system, positioned between the platform and the playing surface, for biasing the platform away from the playing surface, and for biasing the platform to a flat planar orientation with respect to the playing surface; a left dual-state switch, for generating a left on/off signal, positioned between the platform and the playing surface, on the left side of the platform's longitudinal axis, and being activated by a pivoting of the platform to the left side; a right dual-state switch, for generating a right on/off signal, positioned between the platform and the playing surface, on the right side of the platform's longitu-

dinal axis, and being activated by a pivoting of the platform to the right side; a central dual-state switch, for generating a central on/off signal, positioned between the platform and the playing surface, substantially along the platform's longitudinal axis, the central switch being activated by a movement of the longitudinal center of the platform towards or away from the playing surface; and a signal processor for converting the left and right on/off signals into directional signals, for converting the central on/off signal into a non-directional on/off signal, and for sending the directional and non-directional signals to the host computer.

Preferably, the system includes a means to combine the directional and non-directional control signals from the riding board controller with the directional and non-directional control signals from a hand-manipulated controller, and in turn, transmit the resultant directional and non-directional control signals to the host computer. In one embodiment, the riding board controller includes a receptacle for receiving signals from the hand-manipulated controller, and a pass-through circuit for transferring control signals from the hand-manipulated controller to the host computer.

In one embodiment of the invention, the riding board controller includes: a slightly curved or beveled bottom surface, which acts as a fulcrum and is adapted to abut the playing surface when a sufficient weight is applied to the top surface of the platform to overcome the biasing system, such that the platform is able to pivot side-to-side about the fulcrum when a player is standing thereon; biasing elements, such as springs, resilient foam, etc., mounted to the bottom surface of the platform and adapted to bias the platform away from the playing surface and to bias the platform to be substantially flat with respect to the playing surface; a left dual-state switch mounted to the left side of the platform's bottom surface; a right dual-state switch mounted to the right side of the platform's bottom surface; and a central switch mounted to the longitudinal centerline of the platform's bottom surface. Therefore, when the operator executes a slight right pivot, both the central and right switches are activated; when the operator executes a slight left pivot, both the central and left switches are activated; when the operator executes a hard right pivot, only the right switch is activated; when the operator executes a hard left pivot, only the left switch is activated; and when the operator jumps from the platform, none of the switches are activated.

In another embodiment of the invention, the controller includes: a base and a platform pivotally supported on the base and adapted to support an operator standing upon it such that the operator can pivot the platform and change the spatial orientation of the platform by shifting his or her weight. The platform is pivotally supported above the base by a pair of supports, which act as a fulcrum, allowing the platform to pivot about its central longitudinal axis above the base. A plurality of sensors, such as on/off switches, activated upon contact with the riding board, are positioned between the platform and the base. First and second pairs of the switches are positioned on either side of the axis, and the switches of the second pair are closer to the axis than the switches of the first pair. The two switches of the first pair, which are positioned furthest to the longitudinal axis, are activated by slight pivots of the riding board about the axis, while the switches closer to the longitudinal axis are activated by pivots of the riding board of great magnitude. An additional switch is provided along the axis beneath the front end of the riding board and is activated by the front end of the riding board pitching downward and upward. The pairs of switches are connected to the signal processor such that the outer switches signal normal right and left turns and the inner pair of switches signal sharp right and left turns. The forward switch signals forward speed when the board pitches down (switch "on") or jump when the board pitches up (switch "off").

Accordingly, it is an object of the present invention to provide a riding board controller in which the user simulates the actual motions made by a computer generated image by shifting his or her weight upon the board; it is an object to provide a controller that can be substituted for a conventional hand-manipulated controller in a conventional video game system or simulator system; it is an object to provide a controller that is capable of providing directional as well as non-directional dual-state signals; and it is an object to provide a controller that is relatively inexpensive and simple to manufacture, and that is also rugged in construction.

Other objects and advantages of the present invention will be apparent from the following description, the accompanying drawings and the appended claims.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a first embodiment of the present invention, shown connected to a conventional video game system;

FIG. **2** is a top plan view of the mounting plate and base portion of the invention of FIG. **1**;

FIG. **3** is a cross sectional view of the invention taken along lines **3**—**3** of FIG. **2**;

FIG. **4** is a cross sectional view of the invention taken along lines **4**—**4** of FIG. **3**;

FIG. **5** is the cross sectional view of FIG. **4**, but showing the first embodiment of the riding board pivoting at an angle relative to the mounting plate;

FIG. **6** is the cross sectional view of FIG. **4**, but showing the first embodiment of the riding board pivoting at a greater angle relative to the mounting plate;

FIG. **7** is a schematic of the interface circuit of the embodiment of FIG. **1**;

FIG. **8** is a schematic of a "one-shot" circuit of an alternate embodiment of the invention;

FIG. **9** is a perspective view of a second embodiment of the present invention, shown connected to a conventional video game system;

FIG. **10** is a top plan view of the controller of FIG. **9**;

FIG. **11** is a bottom plan view of the controller of FIGS. **9** and **10**;

FIG. **12** is a cross-sectional, elevational view taken along lines **12**—**12** of FIG. **11**;

FIG. **13** an cross-sectional, elevational view of a switch and circuit board for use with the invention;

FIG. **14** is a schematic, cross-sectional representation of the riding board controller having a weight applied from above, but not pivoting at any angle;

FIG. **15** is a schematic, cross-sectional representation of the riding board controller of FIG. **14** pivoting slightly to the left;

FIG. **16** is a schematic, cross-sectional representation of the riding board controller of FIG. **14** pivoting substantially to the left;

FIG. **17** is a schematic of the interface circuitry of the embodiment of FIG. **9**; and

FIG. **18** is a logic diagram of signal processing circuitry for use with the embodiment of FIG. **9**.

## DETAILED DESCRIPTION

As shown in FIG. **1**, a first embodiment of the riding board game controller of the present invention, generally designated **20**, is shown connected to a conventional video game system **10** that includes a monitor **12** and a host computer **14**. The host computer **14** generates audio-visual signals and transmits them to the monitor **12**. The host computer **14** has a receptacle on a control port **16** for receiving control signals from a conventional hand-held game controller **18** or the riding board controller **20**. The riding board controller **20**, as shown in FIG. **1**, is interconnected between the host computer **14** and the hand-held controller **18**.

As shown in FIGS. **1** and **2**, the riding board controller **20** generally comprises a base **22** having a mounting plate **24**, and a platform **26** adapted to support an operator or player standing thereupon. Preferably, the platform **26** is the size and shape of a skateboard. A pass-through control port **28**, mounted on the base **22**, connected to the control cable **29** of the controller **18**, receives control signals from the conventional hand-held controller. The combination of control signals from the riding board controller **20** and the hand-held controller **18** are sent serially to the host computer **14** through control cable **30** to connector **16**.

As shown in FIG. **2**, the platform **26** is pivotally supported on the mounting plate **24** by a fulcrum and biasing system comprising front and rear pivot supports **31**, **32**, respectively. The pivot supports **31**, **32** are mounted on the mounting plate **24** substantially along a longitudinal axis A of the platform **26**. The pivot supports **31**, **32** allow for pivoting of the platform **26** with about a central longitudinal axis A of the platform **26**, yet bias the platform **26** away from the mounting plate **24** and bias the platform in a generally flat planar orientation with respect to the mounting plate **24**.

Pivot sensors in the form of a pair of outer switches **40**, **42** and inner switches **46**, **48** are attached to the mounting plate **24** and are positioned thereon such that switches **40**, **46** are on one side of axis A and switches **42**, **48** are positioned on the other side. Switches **40**, **42** are spaced further from axis A than switches **46**, **48**. As will be explained in greater detail below, outer switches **40** and **42** are positioned to detect slight pivoting of the platform **26** about axis A, while inner switches **46** and **48** are positioned to detect pivoting of the platform to a greater degree.

Switch **44** is positioned substantially on axis A adjacent to the front pivot support **31**. Switch **44** is positioned to detect pitching of the front portion **50** (see FIG. **3**) of the platform **26**, resulting from pivoting of the platform about rear pivot support **32**.

Switches **40**, **42**, **46** and **48** are preferably positioned on the mounting plate **24** past the midpoint of the platform **26** near the rear pivot support **32** to minimize interference with the upward and downward pitching of the front portion **50**. It is within the scope of the invention to include additional switches on the mounting plate **24** to detect additional changes in the spatial orientation of the platform **26**. For example, an additional switch (not shown) may be placed substantially along the longitudinal axis A adjacent to the rear pivot support **32** to detect downward pitching of the rear portion **52** (see FIG. **3**) of the platform **26**. Furthermore, although pressure sensitive switches are the preferred sensor in this embodiment, it is within the scope of the invention to use any sufficient alternative sensors, such as contact sensitive switches or optical sensors, to detect changes in the spatial orientation of the platform **26**.

Pivot stop **54** and a biasing spring **56** pairs are mounted on the mounting plate **24** and positioned on either side of the axis A. The stops **54** limit the pivotal movement of the platform **26**, and the biasing springs **56** provide a predetermined resistance to platform pivotal movement and return the platform **26** to a position substantially parallel to the mounting plate **24** when pivoting pressure to the platform is removed. Therefore, the platform **26** is mounted on the base **22** to allow a certain amount of freedom of movement which is enough to give the operator the tactical feedback required to effectively play the game, yet not so much freedom of motion to make the riding board game controller **20** difficult or awkward to control.

As shown in FIG. **3**, the front pivot support **31** is configured to allow radial pivoting of the platform **26** with respect to the axis A; and also to allow for upward and downward pitching of the front portion **50** of the platform **26** with respect to the mounting plate **24**. The front pivot support **31** comprises a seat **58** attached screwed to the platform **26** and positioned substantially along axis A, a threaded front support bolt **60** having a hex head captured in the seat **58** and a shank extending through the mounting plate **24**. A coil compression spring **62** is positioned adjacent to the front support bolt **60** and extends between the seat **58** and the mounting plate **24**, and a stop nut **64**, mounted on the end of the shank of the front support bolt **60**, is positioned beneath the mounting plate **24** to secure the front pivot support **31** to the mounting plate **24**. The nut **64** preferably is a lock nut or a prevailing torque nut. A hole **66** is formed in the mounting plate **24** and allows the front support bolt **60** to pass through the mounting plate **24**. The hole **66** has a diameter substantially larger than the front support bolt **60**, but smaller than the diameter of the stop nut **64**, to facilitate the pivoting and vertical pitching of the front pivot support **31** with respect to the mounting plate **24**, while the front support and front bolt **60** remain fixed relative to the platform **26** and attached to the mounting plate **24** by stop nut **64**.

Front support bolt **60** preferably extends through the coil spring **62**. Spring **62** causes the front portion **50** of the is platform to be elevated slightly, to the extent allowed by the length of the front support bolt **60** and the position of the stop nut **64**. The spring **62** allows a player (not shown) standing upon the platform **26** to control downward pitching of the front portion **50** by leaning forward against the force of the spring **62**. The spring **62** also causes the front portion **50** to return to the initial elevation when the player takes his or her weight off the platform **26** or leans toward the rear portion **52** of the platform.

The rear pivot support **32** comprises a seat **68** screwed to the platform **26** substantially along the axis A, a threaded rear support bolt **70** having a hex head captured in the seat **68** and a shank extending through rubber bushings **72** and the mounting plate **24**, a stop nut **74** mounted on the end of the rear support bolt **70**, and a coil compression spring **76** positioned adjacent to the rear support bolt **70** and extending between the mounting plate **24** and the stop nut **74**. The bushings **72** extend between the seat **68** and the mounting plate **24** and are adapted to bear a substantial portion of the weight of the player. The stop nut **74** (which can be a lock nut or prevailing torque nut) secures the rear pivot support **32** within the mounting plate **24**.

A hole **78** in the mounting plate **24** allows the rear support bolt **70** to pass through the mounting plate **24** and has a larger diameter than the rear support bolt **70**, but smaller than the spring **76**, and the stop nut **74**. The diameter of the hole **78** thus facilitates the pivoting of the rear pivot support **32** with respect to the mounting plate **24**, while the rear pivot support remains secured to the mounting plate **24** by stop nut **74**.

Rear support bolt **70** preferably extends through a coil compression spring **76**, which ensures that the rear pivot support **32** has freedom to move, but, in combination with bushings **72** (as well as front pivot support **30** and biasing springs **56**) tends to return the platform **26** to an upright position substantially parallel with the mounting plate **24** when no one stands on the platform.

The rear pivot support **32** is configured to allow radial pivoting of the platform **26** with respect to the longitudinal axis A, while bearing a majority of the player's weight. Having the rear pivot support **32** bear the majority of the player's weight is consistent with the way conventional skate boards, snow boards and surf boards are usually ridden.

As can be seen in FIG. **3**, the switches **40–48** have actuating levers **80** biased upwardly with internal springs (not shown) to keep the levers elevated and the switch contacts open. When the platform **26** is pivoted, as shown in FIG. **5**, the platform applies pressure to switch lever **80** of switch **42**, which in turn closes the contacts of that switch. It is also possible to provide two sets of contacts for each switch such that one set of contacts is active when the lever is up and the other set of contacts is active when the lever is down. Therefore, the two sets of contacts will be mutually exclusive, such that it would be impossible to have continuity in both sets of contacts at one time.

As shown in FIG. **4**, when the player is not shifting his or her weight to either of the left or right side of the platform **26** and axis A, no angle exists between a front pivot support centerline B and a vertical axis C. As shown in FIG. **5**, when the player shifts his or her weight slightly to the right, the platform **26** pivots from the vertical axis C at a slight angle D. At this angle D, the platform **26** forces the lever **80** of switch **42** to close the connection between the contacts of switch **42**, thus activating the switch. A slight weight shift of the same magnitude to the opposite direction will correspondingly cause the platform **26** to pivot in an opposite direction relative to axis A (see FIG. **2**) to activate switch **40**. Preferably, the is pivot angle D is approximately 7°.

As shown in FIG. **6**, when the player shifts his or her weight substantially to the right, the platform **26** pivots from the vertical axis C at a greater angle E. At angle E, the platform **26** contacts lever **80** to close switch **48**. A substantial weight shift of the same magnitude in the opposite direction will correspondingly cause the platform **26** to close switch **46**. Preferably the angle E is approximately 15°.

As shown in FIG. **7**, the interface circuit **86** interconnects the switches **40–48** with control port **16** of the host computer **14** and preferably is located within the base **22** (see FIGS. **4–6**). The interface circuit **86** typically includes a micro-controller or micro-processor **88** which is connected to read the status of the switches **40 48** and receive pass-through control signals **90** from the hand-held controller pad **18** via pass-through control port **28**. The micro-controller **88** processes the switch status and pass-through signals collectively to generate control signals **92**, and then transmits the control signals **92** to the host computer control port **16**. Communication buffers **94** monitor and control communication between micro-processor **88** and the control ports **16** or pass-through control ports **28**. Clock circuit **96** controls the timing of the interface circuit **86**. Pull-up resistors **98** condition the switch signals to the micro-controller **88**.

A power supply (not shown) is required to power the interface circuit **86**. The power supply may be a battery located in the base **2** or simply a current received over cable **30** from the host computer **14**. Conventional video game systems often require the respective game controllers to have interface circuits especially adapted to communicate with the host computers of the systems. These interface circuits are widely known in the art and any of them can be incorporated into the riding board controller **20** as interface circuit **86**. Furthermore, pass-through circuits are also widely known in the art and are therefore also easily incorporated into interface circuit **86**. Therefore, it is within the scope of the invention to use any suitable signal processor means to read the switch-or sensor signals and convert them, along with any pass-through signals, into the required game control signals. Furthermore, the entire interface circuit **86** could conceivably be imprinted onto one integrated circuit chip.

It is preferred that the "jump" command sent by the riding board controller **20** be separated from the "accelerate" command and also be a short one-shot or pulse signal. Therefore, micro-controller **88** is programmed to provide such a signal when switch **44** is deactivated. Alternatively, if the interface circuit **86** does not have a programmable controller **88**, a one-shot circuit may be constructed.

As shown in FIG. **8**, a simple one-shot circuit **110** breaks switch **44** into two switch signals: an "accelerate" signal **104**, which reads "low" when switch **44** is activated, and reads "high" when deactivated; and a "jump" signal **106**, which reads "low" for a short time when switch **44** is first deactivated, and reads "high" both when switch **44** is activated and after the short "low" pulse.

The one-shot circuit **110** operates as follows. As the contacts **108** of switch **44** open, a rising signal is generated at the input of NOT gate **100**. This generates a corresponding "low" signal on the output of gate **100**, causing capacitor **102** to begin recharge. As a result, the "jump" signal **106** reads "low" as capacitor **102** is fully recharging. When capacitor **102** is recharged, signal **106** reads "high" even though the output of gate **100** remains "low" indefinitely. when switch **44** is closed again, the process starts over.

In operation, the riding board controller **20** is first connected to the control port **16** of the video game system **10**. A software video-game program based on a skateboarding, snowboarding, or surfboarding theme is operating in the host computer **14**, which in turn is displaying the game's audio-visual signals on monitor **12**. A player standing on the riding board controller **20** controls the video game action in the following manner. When the player leans slightly to the left, thus pivoting the platform to activate only switch **40**, causes the riding board controller **20** to send a "left-turn" directional signal to the video game. When the player leaning substantially to the left, pivoting the platform to activate both switches **40** and **46**, causes the riding board controller to send a "left-turn" directional signal in combination with a "sharp-turn" non-directional signal to the video game. When the player leans slightly to the right, pivoting the platform to activate switch **42** (and in turn deactivating switches **40** and **46**) causes the riding board controller to send a "right-turn" directional signal to the video game. When the player leans substantially to the right, the pivoting platform activates switches **42** and **48**, which cause the riding board controller to send a "right-turn" directional signal in combination with a "sharp-turn" non-directional signal to the video game.

When the player leans forward, the platform pitches downwardly to activate switch **44** and cause the riding board controller to send an "accelerate" non-directional signal to the video game. When the player leans backwards, the platform pitches upwardly to deactivate switch **44** thus

causing the riding board controller to send a one-shot "jump" signal to the video game. Furthermore, the player may be simultaneously holding a hand-held controller **18** inserted into the pass-through port **28**, and could thus command the video game to perform a multitude of functions by hand such as ducking or throwing elbows, or could start the game or scroll through a menu to select a game.

As shown in FIG. **9**, a second embodiment of the riding board game controller of the present invention, generally designated **20'**, is shown connected to a conventional video game system **10'** that includes a monitor **12** and a host computer **14**. The host computer **14** generates audio-visual signals and transmits them to the monitor **12**. The host computer **14** has a receptacle on a control port **16** for receiving control signals from a conventional hand-held game controller **18'** and the riding board controller **20'**. The riding board controller **20'**, is connected to the host computer **14** via the hand-held controller **18'**. The hand-held game controller includes dual-state directional switches **200** and dual-state non-directional switches **202**.

As shown in FIGS. **9–12**, the riding board controller **20'** generally comprises a platform **26'** having a left side **132** and a right side **134**; adapted to support an operator or player standing thereupon. Preferably, the platform **26** is the size and shape of a skateboard. A chassis **120**, for housing the internal electronics of the riding board controller is mounted to the bottom surface of the platform **26'**. A control port **28'**, mounted on the chassis **120**, connected to the control cable **29**, sends dual-state switch signals to the hand-held controller. The combination of control signals from the riding board controller **20'** and the hand-held controller **18'** are sent serially to the host computer **14**, through control cable **30**, to connector **16**.

The chassis **120** includes a bottom surface having a flat and lower-most longitudinal center portion **122**; an angled or beveled left surface portion **124**, angled upwardly from the flat center portion **122**; and an angled or beveled right surface portion **126**, angled upwardly from the flat center portion **122**. The bottom surface of the chassis **122**, **124**, **126** thus forms a fulcrum about which the platform **26'** can pivot when stood upon by the operator. The pivoting of the platform **26'** about the fulcrum formed by the bottom surfaces of the chassis will be discussed in greater detail below.

A biasing system comprises a rear resilient foam pad **128** and a forward resilient foam pad **130**. Each of the pads **128**, **130** have portions **128***a*, **128***b*, **130***a*, **130***b*, positioned on the left side **132** and the right side **134** of the axis A', respectively (each portion representing an individual biasing element), that are sufficiently thick (i.e., having a thickness such that the pads can extend beyond the flat bottom surface **122** of the chassis when the pads are not compressed) and sufficiently resilient so as to lift the flat center portion **122** of the chassis bottom surface above the floor **136** (playing surface), when no weight is being applied to the top surface of the platform **26'**; yet they are sufficiently flexible to allow a player, standing upon the platform **26'**, to shift his or her weight such that the platform **26'** will pivot significantly upon the fulcrum formed by the chassis **120** left or right, depending upon the amount of weight shifted to the particular side. The resiliency of the foam pads will also allow the platform to flatten itself with respect to the playing surface when no weight is being applied to the top surface of the platform.

A circuit board **137**, to which electronic circuitry is mounted (see FIG. **17**), is mounted within the chassis **120**. Also mounted to the top surface **138** of the circuit board are three silicone switches: a left switch **140** extending through the left bottom surface portion **124** of the chassis, a right switch **142** extending through the right bottom surface portion **126** of the chassis, and a central switch **144** extending through the center bottom surface portion **122** of the chassis.

As shown in FIG. **13**, each of the silicone switches include a rubber button **146**, supported above the circuit board **137** by collapsible rubber support web **148**. Mounted to the bottom surface of the rubber button is a carbon pill **150**. The rubber support web acts to keep the carbon pill **150** elevated with respect to the circuit board until sufficient weight is applied to the top of the rubber button, causing the rubber support web to collapse. A pair of conductive traces **152**, **154** coupled to the signal processing circuit, are etched into the top side **138** of the circuit board, directly below the carbon pill **150**. When the carbon pill contacts the conductive traces **152**, **154**, the conductivity of the carbon pill will short the two traces together, activating the particular switch on the circuit board.

The left, right and central switches **140**, **142**, and **144** are mounted such that their rubber buttons extend below their respective chassis bottom surface portions **124**, **126**, **122** when the switches are not collapsed. Thus when weight is applied to the top of the platform **26'**, substantially evenly centered with respect to the longitudinal axis A', as shown in FIG. **14**, all three switches will collapse and activate. As shown in FIG. **15**, when the operator shifts his or her weight slightly to the left, the platform will pivot on the chassis **120** to the left and will cause the right switch **142** to recover and deactivate. As shown in FIG. **16**, when the operator shifts his or her weight significantly to the left, the platform will pivot on the chassis **120** substantially to the left to allow the central switch **144** to recover enough such as to allow the central switch to deactivate.

Likewise, if the operator shifts only slightly to the right, both the right and central switches **142**, **144** will be activated; and if the operator shifts significantly to the right, only the right switch **142** will be activated.

It will be apparent to those of ordinary skill in the art that it is within the scope of the invention to incorporate any type of fulcrum system mounted to the bottom of the riding board controller **20'**, adapted to abut the floor **136** when the operator stands upon the platform **26'**, and adapted to allow the operator to pivot the platform with respect to the axis A'. For example, a fulcrum bar can be attached along the axis A' or the bottom surface of the chassis can be curved, etc.

Referring again to FIGS. **10** and **12**, the controller **20'** may also include a foot pedal **156**, operatively connected to a dual-state switch **158** (see FIG. **17** described below). The foot pedal, which is preferably pressure activated, may be used as an "accelerator," for example.

As shown in FIG. **17**, the hand-manipulated controller **18'** includes signal processing circuitry **160**, which is generally used to transmit directional and non-directional control signals to the host computer **14**, via port **16**, based upon the states of the dual-state switches **140**, **142**, **144**, **158** on the riding board controller **20'** and the dual-state switches **200**, **202** on the hand-manipulated controller **18'**. The hand-manipulated controller **18'** includes a connector **164** for coupling to the control cable **29**, and a connector **165** for coupling to the control cable **30**. Pull-up resistors **170**, **171** condition the switch signals to the processing circuit. A power supply (not shown) is required to power the signal processing circuitry **160**. The power supply may be a battery located in the hand-manipulated controller **18'** or simply a current received over control cable **30** from the host computer **14**.

As shown in FIG. **18**, an example logic diagram for the signal processing circuitry **160** is provided that converts the states (signals) of the left, right, and center switches **140**, **142**, and **144** into directional control signals **166***a* ("LEFT"), **166***b* ("RIGHT"), and **166***c* ("GO") and into non-directional signals **166***d* ("EXTREME TURN") and **166***e* ("JUMP"). A one-shot circuit **174** can be used with the JUMP signal **166***e*. It will be apparent to one of ordinary skill in the art that it is within the scope of the present invention that any type of signal processing circuitry, including microprocessor circuits, be used as the signal processing circuitry **160**.

In operation, the riding board controller **20'** is first connected to the control port **16** of the video game system **10'**. A software video-game program based on a skateboarding, snowboarding, or surfboarding theme is operating in the host computer **14**, which in turn is displaying the game's audio-visual signals on monitor **12**. A player standing on the riding board controller **20'** controls the video game action in the following manner. When the player leans slightly to the left, thus pivoting the platform to activating switches **140** and **144**, causes the riding board controller **20'** to send only a "LEFT" directional signal **166***a* to the video game. When the player leaning substantially to the left, pivoting the platform to deactivate switch **144**, causes the riding board controller to send a "LEFT" directional signal **166***a* in combination with an "EXTREME TURN" **166***d* nondirectional signal to the video game. When the player leans slightly to the right, pivoting the platform to activate only switches **142** and **144**, causes the riding board controller to send only a "RIGHT" directional signal **166***b* to the video game.

When the player leans substantially to the right, the pivoting platform deactivates switch **144**, which cause the riding board controller to send a "RIGHT" directional signal **166***b* in combination with an "EXTREME TURN" nondirectional signal **166***d* to the video game.

When the player jumps from the platform, the biasing system of the platform causes all the switches to deactivate, causing the riding board controller to send a one-shot "JUMP" signal **166***e* to the video game. Furthermore, the player may be simultaneously holding the hand-held controller **18'**, and could thus command the video game to perform a multitude of functions by hand such as ducking or throwing elbows, or could start the game or scroll through a menu to select a game.

Having described the invention in detail and by reference to the drawings, it will be apparent that modification and variations are possible without departing from the scope of the invention as defined in the following claims.

What is claimed is:

**1**. A riding board game controller for sending directional and non-directional control signals to an audiovisual game having an audio-visual display device, a microprocessor-based host computer for sending audio-visual signals to said display device, and a software program for operating on said host computer to generate said audio-visual signals in response to said control signals, the riding board game controller comprising:

a platform having a longitudinal axis supported for pivotal movement along said longitudinal axis above a playing surface and for supporting an operator standing on said platform, such that side-to-side pivoting of said platform is effected by an operator shifting his or her weight side-to-side while standing on said platform;

a resilient support positioned between said platform and said playing surface for urging said platform to maintain a substantially horizontal configuration;

a first dual-state switch, for generating a first dual-state signal, said first switch being positioned beneath said platform on a side of said longitudinal axis to be actuated by pivoting of said platform to said side;

a second dual-state switch for generating a second dual-state signal, said second switch being positioned beneath said platform on an opposite side of said longitudinal axis, said second switch being actuated by pivoting of said platform to said opposite side;

a third dual-state switch for generating a third dual-state signal, said third switch being positioned beneath said platform, surface, substantially near said longitudinal axis, said third switch being actuated by movement of said longitudinal axis towards or away from said playing surface; and

a signal processor for converting said first and second dual-state signals into directional control signals and said third dual-state signal into a non-directional signal, and for sending said directional and non-directional control signals to said host computer.

**2**. The controller of claim **1** further comprising means for combining said directional and non-directional signals with additional control signals from a hand-held controller and for transferring said directional, non-directional and additional control signals to said host computer.

**3**. The controller of claim **1** wherein:

a bottom surface of said platform is shaped to act as a fulcrum aligned with said longitudinal axis, said bottom surface being positioned to abut said playing surface when force is applied to said platform sufficient to overcome said resilient support, such that said platform will pivot side-to-side about said bottom surface when a player stands upon said platform and shifts his weight; and

said resilient support includes a pair of biasing elements, mounted on said bottom surface on opposite sides of said longitudinal axis, said element being adapted to urge said platform to be parallel with respect to said playing surface and urge said platform away from said playing surface such that said fulcrum is separated from said playing surface when no force is applied to said platform.

**4**. The controller of claim **3** wherein said biasing elements include a resilient foam pad.

**5**. The controller of claim **1** wherein said switches are mounted on a bottom surface of said platform.

**6**. The controller of claim **5** further comprising a circuit board mounted on said bottom surface of said platform, wherein said switches are mounted on said circuit board.

**7**. The controller of claim **6** wherein said first, second and third switches comprise silicone rubber button switches.

**8**. The controller of claim **6** wherein:

said bottom surface is shaped to act as a fulcrum aligned with said longitudinal axis, said bottom surface being positioned to abut said playing surface when a force is applied to said platform sufficient to overcome said resilient support, such that said platform will pivot side-to-side about said fulcrum when a player stands upon said platform and shifts his weight; and

said resilient support includes a pair of biasing elements, mounted on said bottom surface on opposite sides of said longitudinal axis, said elements urge said platform to be parallel with respect to said playing surface and urge said platform away from said playing surface such that said fulcrum is separated from said playing surface when no force is applied to said platform.

9. The controller of claim 8 further comprising a dual-state pressure switch having a foot pedal for generating a fourth dual-state signal, said pressure switch being positioned on a top surface of said platform to be activated by positive pressure being applied to said foot pedal, wherein said signal processor converts said fourth dual-state signal into a non-directional control signal.

10. The controller of claim 1, wherein:

said platform is pivotally mounted to said playing surface;

said playing surface is a top surface of a base;

said first, second and third switches are mounted to said top surface of said base; and

said signal processor is mounted within said base.

11. A riding board game controller for sending directional and non-directional control signals to an audiovisual game having an audio-visual display device, a microprocessor-based host computer for sending audio-visual signals to said display device, and a software program for operating on said host computer to generate said audio-visual signals in response to said control signals, the riding board game controller comprising:

a platform having a longitudinal axis supported for pivotal movement along said longitudinal axis on a playing surface and for supporting an operator standing on said platform, such that side-to-side pivoting of said platform is effected by an operator shifting his or her weight side-to-side while standing on said platform;

a resilient support positioned between said platform and said playing surface for urging said platform to maintain a substantially parallel orientation to said playing surface;

a first dual-state switch for generating a first dual-state signal, said first switch being positioned between said platform and said playing surface, on a side of said longitudinal axis to be actuated by pivoting of said platform to said first side at a first angle with respect to said playing surface;

a second dual-state switch for generating a second dual-state signal, said second switch being positioned between said platform and said playing surface on an opposite side of said longitudinal axis, said second switch being actuated by pivoting of said platform to said opposite side at said first angle with respect to said playing surface;

a third dual-state switch for generating a third dual-state signal, said third switch being positioned between said platform and said playing surface, said third switch being actuated by pivoting said platform at a second angle with respect to said playing surface, said second angle being larger than said first angle; and

a signal processor for converting said first and second dual-state signals into directional control signals, for converting said third dual-state signal into a non-directional signal, and for sending said directional and non-directional control signals to said host computer.

12. The controller of claim 11, further comprising means for combining said directional and non-directional signals with additional control signals from a hand-held controller and for transferring said directional, non-directional and additional control signals to said host computer.

* * * * *

# Exhibit 16

#25 Reply Brief 1-10-02 KPaired

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



Appellants : M. KLEIN et al.

Appln. No. : 09/390,996

Filed : September 7, 1999

Group Art Unit: 2673

Examiner: J. Nguyen

For : METHOD AND DEVICE FOR DETECTING SPECIFIC STATES OF MOVEMENT OF A USER

**REPLY BRIEF**

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

This Reply Brief is in response to the Examiner's Answer of November 7, 2001. A Request for an Oral Hearing is being filed concurrently with this Reply brief.

I. Appellants' response to the Examiner's Non-agreement with Appellants' Grouping of Claims

The Examiner did not agree with Appellants' section "**G. GROUPING OF CLAIMS**". Appellants agree that this section was not entirely clear in indicating that each of dependent claims 8, 12, 14, 22, and 25-27 stand or fall with claim 1, for purposes of this Appeal, with claim 1 being the only independent claim.

Accordingly, Appellants respectfully submit the following new statement regarding the Grouping of Claims:

The following groups of claims are considered to stand or fall together, but only for the purpose of this appeal: claims 1 and 8 stand or fall together; claims 1, 12 and 14 stand or fall together; claims 1 and 22 stand or fall together; claims 1, 25 and 27 stand or fall together; and claims 1 and 26 stand or fall together. The remaining claims do not stand or fall together, at least for reasons explained in the Appeal Brief.

II. Appellants again disagree that claims 1, 8, 12 and 25-27 do not Patentably Define Appellants' Invention; the Rejection Should be Reversed

Reversal of the rejection of claims 1, 8, 12 and 25-27 under 35 U.S.C. 102(e) as anticipated by LIPPS is requested.

In the Examiner's Answer page 3, paragraph 10, the Examiner again cites Fig. 3, col. 5, lines 56-60 and col. 6, lines 12-16 in support of the rejection and asserts, among other things, that LIPPS discloses all the features of independent claim 1 including an upper surface 26 which is movable "in a direction parallel to the axis of vertically oriented when the upper surface is oriented horizontally." Appellants respectfully traverse the Examiner's assertions for the reasons already made of record in the Appeal Brief on pages 17-24.

Appellants further emphasize that contrary to the Examiner's assertions, the platform 26 cannot move in a direction parallel to the axis C, i.e., an axis which is vertically oriented when the support surface is oriented horizontally. It is discernable from Fig. 3 that end 50 of the platform 26 is movable downwards, i.e., against the biasing force of the spring 62.

However, the same cannot be said of end 52 because rubber bushings 72 prevent the downward movement of this end. Accordingly, it is apparent that the downward movement of only one end, i.e., end 50, would only constitute a tilting movement, rather than a movement that is parallel to the axis C. In other words, the tilting movement shown in LIPPS is a non-parallel movement of only one end of the platform 26. On the other hand, claim 1 recites, inter alia, that a support unit comprises a standing part having a support surface and is mounted in a tiltable manner on a base part, wherein *the support surface can either rotate about an axis or move in a direction which is parallel to said axis*, said axis being one of:

vertically oriented when the support surface is oriented horizontally;

perpendicular to at least the support surface; or

running through at least the base part and the support surface when the support surface is not tilted; or

running through at least the support surface and a tiltable mounting; or

running through at least the base part and a tiltable mounting.

Thus, the invention provides for a movement of the entire platform 26 downward or upward and/or parallel to axis C. Appellants emphasize that the platform 26 of LIPPS cannot move up and down with respect to any certain axis as recited in claim 1, and, again, the Examiner has failed to identify any such axis.

Because LIPPS fails to disclose all the recited features of at least amended

independent claim 1, Appellants submit that LIPPS fails to disclose each and every recited feature of the instant invention. Thus, Appellants submit that the Examiner has failed to establish an adequate evidentiary basis to support a rejection of anticipation under 35 U.S.C. § 102(e), and that the instant rejection is improper and should be withdrawn.

Claims 8, 12 and 25-27 stand or fall with independent claim 1 for purposes of this appeal.

Thus, for reasons already of record as well as those given above, reversal of the rejection of claims 1, 8, 12 and 25-27 is requested.

III. Appellants again disagree that claims 9, 13, 14 and 22 do not Patentably Define Appellants' Invention; the Rejection Should be Reversed

Reversal of the rejection of claims 9, 13, 14 and 22 under 35 U.S.C. 103(a) over LIPPS in view of McSHANE is requested.

In the Examiner's Answer on page 4, the Examiner again acknowledges that LIPPS fails to disclose a tilt restoring device and a vertical restoring device which each comprise compressible elements, a variable vertical restoring device, and a support surface having a non-slip surface. However, the Examiner asserted that McSHANE teaches these features and that it would have been obvious to provide these feature on the device of LIPPS in order to allow the user to stand stably and to adjust a desired resistance. Appellants respectfully traverse the Examiner's assertions for the reasons already made of record in the Appeal Brief

on pages 25-32.

IV. Appellants again disagree that claims 21 and 23 do not Patentably Define Appellants' Invention; the Rejection Should be Reversed

Reversal of the rejection of claims 21 and 23 under 35 U.S.C. 103(a) over LIPPS in view of FURTADO is requested.

In the Examiner's Answer on page 5, the Examiner again acknowledges that LIPPS fails to disclose a bearing device which is tiltable relative to a horizontal axis and at least one retaining loop for retaining a foot on the support surface, and a mechanism for tilting the base structure. However, the Examiner asserted that FURTADO teaches these features and that it would have been obvious to provide these features on the device of LIPPS in order "to provide a particular varied slope to a user depending on his level skill (col. 33, lines 18-32) and to help the user stably remaining on the support surface while operating the device." Appellants respectfully traverse the Examiner's assertions and conclusions for the reasons already made of record in the Appeal Brief on pages 33-38.

V. Appellants again disagree that claim 24 does not Patentably Define Appellants' Invention; the Rejection Should be Reversed

Reversal of the rejection of claim 24 under 35 U.S.C. 103(a) over LIPPS in view of WARD is requested.

In the Examiner's Answer on page 6, the Examiner again acknowledges that LIPPS fails to disclose an optoelectronic sensor device. However, the Examiner asserted that WARD teaches this feature and that it would have been obvious to provide this feature on the device of LIPPS because LIPPS teaches that other types of sensors may be used as a matter of design choice. Appellants respectfully traverse the Examiner's assertions and conclusions for the reasons already made of record in the Appeal Brief on pages 38-43.

VI. Appellants' reply to the Examiner's Response to Argument

In the Examiner's Answer on page 7, paragraph 11, the Examiner asserted that "since the bushings 72 are made by rubber, which has a capability of resilience, the bushings 72 in combination with the spring 76 allow the rear portion 52 of the platform 26 to move downward an amount, which is possibly same as an amount that the front portion moves downward." The Examiner then concluded that the "platform possibly moves in a direction which is parallel to the axis C" and that LIPPS "implicitly teaches that the platform 26 can move in a direction which is parallel to the axis C."

Appellants completely disagree with each of these assertions and conclusions. Appellants note that there is no disclosure in LIPPS suggesting that the bushings 72 (see Figs. 3 and 4) would allow for any significant downward movement of the platform 26, much less, a downward movement which is parallel to axis C. On the other hand, Appellants do not disagree that the spring 62 allows the platform 26 to move downwards. The question is,

however, does the platform 26, which is mounted on one of its ends 52 to a bushing 72 and on another of its ends 50 to a spring 62, have the ability to move upwards and/or downwards parallel to axis C? Appellants assert that the answer is no, and that at the very least, this document does not disclose such movement.

Appellants submit that this document merely discloses that the platform 26 can tilt downwardly, and only at end 50 when the spring 62 is compressed. The bushings 72 are clearly not designed to allow the platform 26 to move downwardly, much less, doing so parallel to axis C. If such parallel movement of the platform 26 were desired in LIPPS, presumably, the bushings 72 would have been replaced with a spring.

Appellants note that, even assuming arguendo, that the Examiner was correct in his assertion that the bushings 72 do allow for significant downward movement by virtue of their being made of rubber (which Appellants disagree with), it is not apparent that a downward force on the platform 26 would necessarily cause the platform 26 to move parallel to axis C. It is more likely that the bushings 72 and the spring 62 have different load carrying abilities and/or more likely that they would deflect and/or compress differently under the same load, i.e., presumably the spring 62 is more likely to be compressed under the same load than the bushings 72. In such case, the platform 26 could not move downwardly the same amount over both the bushings 72 and the spring 62. Such uneven movement, even if possible, could not be characterized as parallel to the axis C.

**CONCLUSION**

For the reasons already advanced in the Appeal Brief as well as those above, Appellants submit that the rejections are erroneous and should be reversed.

The Commissioner is authorized to charge any additional fee, or to credit any overpayment, to Deposit Account No. 19-0089.

Respectfully submitted,
M. KLEIN et al.

Reg. No. 45,294
Neil F. Greenblum
Reg. No. 28,394

January 3, 2002
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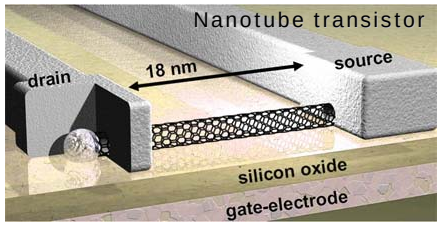
# Exhibit 17

# Nanotechnology




"**Nano**" – From the Greek word for "dwarf" and means $10^{-9}$, or one-billionth. Here it refers to one-billionth of a meter, or 1 nanometer (nm).

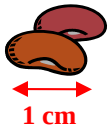
**1 nanometer** is about 3 atoms long.

"**Nanotechnology**" – Building and using materials, devices and machines at the nanometer (atomic/molecular) scale, making use of unique properties that occur for structures at those small dimensions.

M. Deal, Stanford

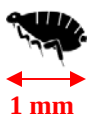
# How small is a nanometer? (and other small sizes)

**Start with a centimeter.**




**A centimeter is about the size of a bean.**

**Now divide it into 10 equal parts.**

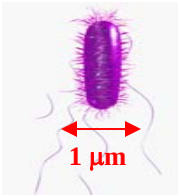



**Each part is a millimeter long. About the size of a flea.**

**Now divide that into 10 equal parts.**

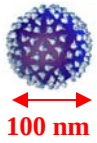

**Each part is 100 micrometers long. About the size (width) of a human hair.**

**Now divide that into 100 equal parts.**



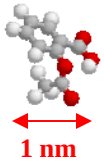

**Each part is a micrometer long. About the size of a bacterium.**

**Now divide that into 10 equal parts.**




**Each part is a 100 nanometers long. About the size of a virus.**

**Finally divide that into 100 equal parts.**



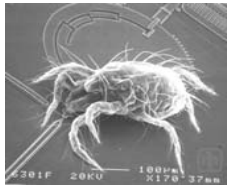

**Each part is a nanometer. About the size of a few atoms or a small molecule.**

M. Deal, Stanford

# The Scale of Things – Nanometers and More

NNIN Nanoscale Science, Engineering & Technology

## Things Natural



Dust mite

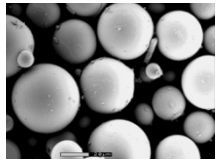
200 μm

Ant

~ 5 mm

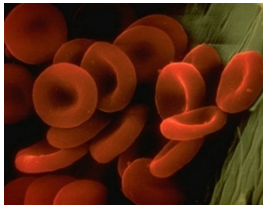
Human hair

~ 60-120 μm wide



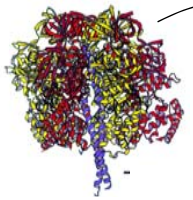
Fly ash

~ 10-20 μm

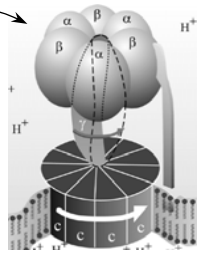


Red blood cells

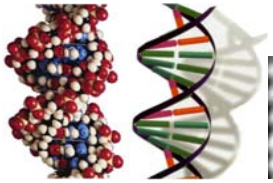
(~7-8 μm)



~10 nm diameter

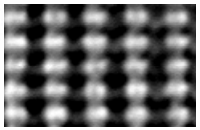


ATP synthase



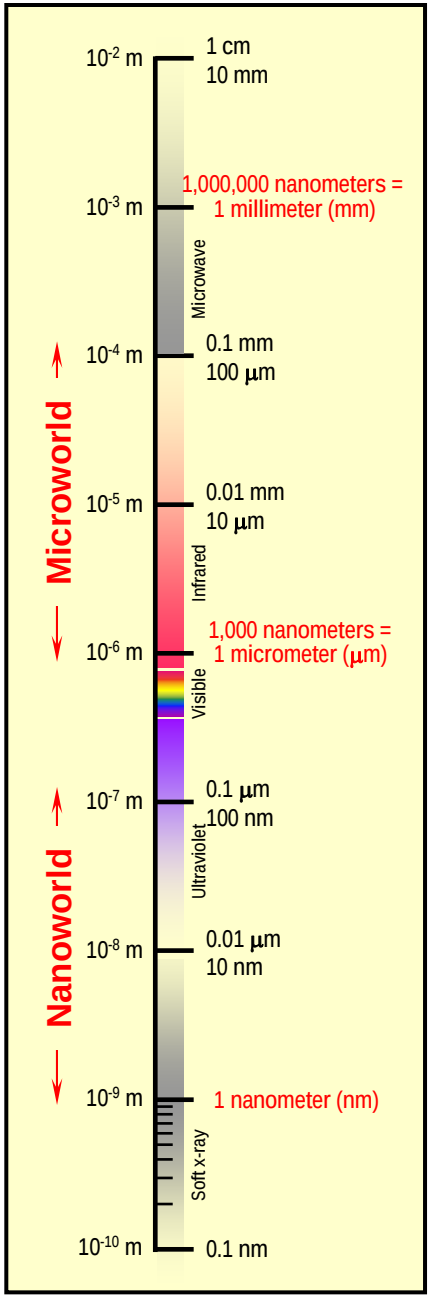
DNA

~2-1/2 nm diameter

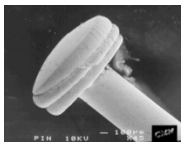


Atoms of silicon

spacing 0.078 nm

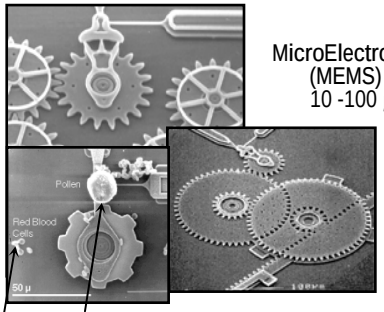



## Things Man-made



Head of a pin

1-2 mm



MicroElectroMechanical (MEMS) devices

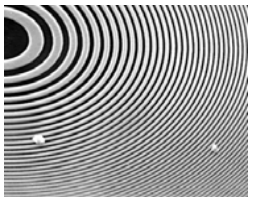
10 -100 μm wide

Adopted from:

*Office of Basic Energy Sciences*
*Office of Science, U.S. DOE*
*Version 05-26-06, pmd*

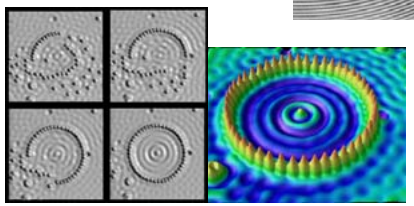
Pollen grain

Red blood cells



Zone plate x-ray "lens"

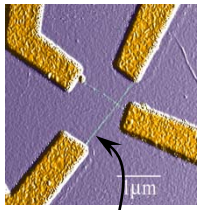
Outer ring spacing ~35 nm



Quantum corral of 48 iron atoms on copper surface positioned one at a time with an STM tip

Corral diameter 14 nm

Nanotube electrode



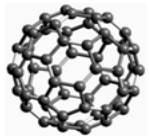


Intel computer chip and single transistor

Smallest dimensions ~ 1nm

Carbon nanotube

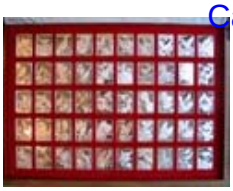
~1.3 nm diameter



Carbon buckyball

~1 nm diameter

# Exhibit 18



**Franklin Mint Silver**

***Medals ~ Ingots ~ Coins ~ Buy ~ Sell***





# Precious Metal Weights and Measures

Because the value of a Franklin Mint set depends largely on its precious metal content, it's important to understand the terminology and units used for measuring gold and silver, and how to use this to determine the bullion value.

Precious metals (gold, silver, and platinum) are measured in units called *troy ounces*. When you see in the newspaper or the Internet (e.g., at the bottom of this page) that the spot price of silver is, for example, $25, this means that the going price for 1 troy ounce of pure .999 silver bullion, as a commodity, in large quantities, is currently $25. A troy ounce is not the same as the commonly used ounce weight - an *avoirdupois ounce* - which is what you get if you weigh a medal on a postal scale, although they are close (about 10% difference). Both types of ounces can be measured in terms of smaller units called *grams* or *grains.*

- 1 troy ounce = 31.103 grams = 480 grains = 1.097 avoirdupois ounce
- 1 avoirdupois ounce = 28.35 grams = 437.5 grains = 0.911 troy ounce

Where you have ounces, you also have pounds, and this gets even more confusing.

- 1 troy pound = 12 troy ounces
- 1 avoirdupois pound = 16 avoirdupois ounces

Throughout this site, when the term "ounce" or the abbreviation "oz" is used, it should be understood to mean troy ounce.

## Purity

The purity of metals is measured in terms of a percentage or fraction of 100% pure. Because no refining process is absolutely perfect, 100% purity is not technologically achievable. Normally .999 or 99.9% is considered as "pure" silver or gold. Modern refining processes can achieve .9999 or better purity, but this is more costly and largely a marketing issue (for example, the American Buffalo is advertised as the U.S. Mint's first .9999 pure gold bullion coin). Gold purity is also expressed in terms of "Karat", abbreviated K or sometimes KT, where 24-Karat is pure gold.

Most Franklin Mint silver issues are minted in Sterling Silver, which is 92.5% or .925 pure silver, although a few are .999 silver. Solid gold or platinum Franklin Mint issues are exceedingly rare, but most are .999 pure. Other private mints, e.g., Danbury Mint, have issued 14KT gold medal sets.

## Common Franklin Mint Weights

Common weights for Franklin Mint issues are 500 grains (1.04 troy Ounces) and 1000 grains (2.08 troy ounces), although sizes of 300, 600, 750, and 900 grains were also made. Larger items were made mostly in 1500, 2500, and 5000 grain sizes. The Franklin Mint did not make any even ounce size items (e.g., 1.0 troy ounce and so marked) that I am aware of, although other private mints commonly made the 1 troy ounce size.

## Determining Bullion Value

Putting this all together, you can determine the bullion value of a Franklin Mint set by calculating (weight * purity * price). For example, for a set of 50 500 grain sterling silver medals, with spot silver at $25/oz, the calculation is:

- 50 pieces * 500 grains = 25,000 grains
- 25000 grains / 480 grains per troy ounce = 52.08 troy ounces sterling

- 52.08 troy ounces * .925 purity = 48.12 troy ounces equivalent pure silver bullion
- 48.12 troy ounces * $25 spot price/oz = $1203 actual bullion value

As an easy guideline, the 500 grain sterling silver size is about .96 oz. pure silver, and the 1000 grain size is about 1.93 oz. These are commonly thought of as 1 oz. and 2 oz. pieces.

## Gold Plating

Because gold is so valuable, many people wonder whether the gold plating on Franklin Mint medals contains a significant amount of gold that would make them more valuable. The answer is no, because the gold plating is so extremely thin that there is a negligible amount of actual gold in the "24kt gold electroplate". Most gold plating is about 10-20 microns thick (1 micron = .001 millimeter). For comparison, a dollar bill is about 200 microns thick, so we're talking less than 1/10 the thickness of a dollar bill! The gold-plated silver medals look great, but the value is the same as the silver value.

Google Search

Web franklin-mint-silver.com